Pentagon Renovation Program Wedges 2-5
Electronic Data Standards
Pentagon Renovation Program
The Pentagon
Washington, DC

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1 Introduction

1.1 General Information

1.1.1 Credits

This standard was originally derived from the Tri-Service CADD Standards (produced by the Tri-Services CADD/GIS Technology Center located in Vicksburg, Mississippi) and was customized by the PENTAGON RENOVATION PROGRAM to meet the requirements of the Pentagon Renovation. Subsequently, at the request of the PENTAGON RENOVATION PROGRAM, the standard has been updated to incorporate, where appropriate, the latest National CAD Standard (version 2) produced by the 'National Institute of Building Sciences'.

1.1.2 Purpose

The purpose of these standards is to provide criteria and guidelines for all electronic data produced by All A/E/C Contractors and their Subcontractors as well as other A/E/C contractors and their subcontractors. These standards are designed to aid managers, architects, engineers, and construction contractors in the production of homogeneous, accurate and professional CADD and Text Documents.

These standards will be updated by the A/E/C based on evolving project requirements and technology over the life of the Wedges 2-5 renovation and will be distributed to PenRen for review as changes are made.

It is the policy of the PenRen Office that all CADD, text documents, and all other PRP contract deliverables covered in this standard be delivered in the appropriate electronic format(s) as described in these standards.

1.1.3 Pentagon Renovation Program Web Site

The standards and support files indicated in this standard are available at the following URL www.renovation.pentagon.mil.

1.1.4 Scope

These standards shall apply to all work performed by All A/E/C Contractors and their Subcontractors, other A/E/C contractors and their subcontractors under contract with the PenRen Office.

If any portion of this document is such that as instructed, a required result cannot be achieved due to technical limitations of related hardware and/or software applications then it should be brought to the attention of the PenRen Office immediately for review and consideration.

These standards may be applied to any other work so designated by the Government.

1.1.5 Responsibility

The EDS IPT, Information Resource Center, Government project managers, Government Contract Officers, A/E/C contractors, Sub-Contractors, Editors, Document Authors, CADD specialist, and designers involved with the PRP are responsible for ensuring that electronic deliverables conform to these standards.

1.1.6 Organization of PRPEDS

Section 1 – Introduction contains general information about these standards.

Section 2 – CADD Standards covers specific standards for architectural, engineering, and some presentation drawings. This section establishes drawing presentation guidelines and specific criteria for CADD deliverables.

Section 3 – Text Document Standards covers specific standards for Text-intensive documents. Such document deliverables include studies, reports, specifications, etc.

Section 4 – Project Controls Standards covers specific standards for project schedules.

Appendices - Contains exhibits, graphic illustrations, charts, and tables, etc.

1.1.7 Acronyms

- A/E/C - Architecture, Engineering, and Construction
- AIA - American Institute of Architects
- CADD-Computer Aided Design and Drafting
- CPM – Critical Path Method
- DGN - MicroStation V8 Triforma 3D Design File
- DoD - Department of Defense
- EDS IPT – Electronic Data Standards Integrated Product Team
- MSAE - Management Support Architect/Engineer
- MSCS - Maryland State Coordinate System
- PRP- Pentagon Renovation Program
- ANSI - American National Standards Institute

1.1.8 General Definitions

- A/E Design Contractor - Architectural/Engineering firm who is responsible for the production of the contract documents for a specific Pentagon Renovation Program construction project.

- Amendment - Written or graphic documents that are issued during the solicitation (construction bidding) period which modify or interpret the bidding documents, including drawings and design specifications. Amendments may include additions, deletions, clarifications, or corrections. Amendments involving drawings may be executed by written description with or without reissue of modified/new drawings. Amendments become part of the contract documents when the contract is executed.

- Construction Contractor - A group that enters into a mutually binding relationship with the Government for the construction, alteration or repair of buildings, structures or other real property in support of the PRP. This term includes the general contractors and sub-contractors.

- Delivery Order - Government issued sub-contract for design services.

- Management Support Architect/Engineer - The Architectural and Engineering firm who will provide overall project management to plan, organize, assist, and coordinate the work to be performed in support of the PRP.

- Modification - The officially approved set of documents issued by the Government to modify the contract.

- Sub-Contractor - Any person or group under contract to a primary design or a construction contractor.

1.2 Executive Summary

1.2.1 Background

The Pentagon Renovation Program (PRP) is a comprehensive effort to renovate the Pentagon and its support facilities and infrastructure throughout the Pentagon Reservation. Work on the PRP will be completed in many phases, and will involve several different government groups and contractors. Each phase of the renovation will bring about the creation of an enormous amount and variety of electronic and hard copy documents. These documents are related to the design, construction, and operation of the renovated Pentagon. The type of documents range from studies and reports to 3D animations to databases. These documents and the information that they contain will be used to populate various databases and decision support systems (databases). Upon completion of the PRP, a subset of these documents will be given to the building owners to populate their Facilities Data Management System (FDMS). In order to maximize the usefulness of such information management systems, as many documents as

possible must be electronic, accurate, and standardized.

The *Pentagon Renovation Program Electronic Data Standards* is an important part of meeting these three goals. The PRPEDS are a contractually binding part of all PRP contracts involving the delivery of electronic documents. Throughout the renovation, many groups have played a part in the ongoing effort to update the electronic standards. For the most part, updates to the electronic standards occur as the demands for information by PRP decision-makers change or increase. The PRPEDS currently cover three major types of electronic documents: CADD, Text Documents, and CPM Schedules. A summary of standards governing these document types is given below.

1.2.2 File Formats

The PRPEDS standards require that all CADD, Text Document, and Schedule deliverables be submitted electronically in each of the *source, electronic bid* and *web* formats. The source format allows the government to reuse, edit, or otherwise manipulate the contents of the file except where the original file is a raster image, as in the case of product literature. The electronic bid-set format is best suited for creating electronic bid-sets which reduces the cost of distributing hard copy. The web format allows documents to be accessible, viewed and printed using a web browser.

1.2.3 CADD Standards

The CADD Standards section of the PRPEDS establishes the guidelines for preparing, organizing, managing, archiving, plotting and delivering CADD drawings including common drafting standards for the project. (See Section 2.0)

1.2.4 Text Document Standards

The Text Document Standards section of the PRPEDS establishes basic guidelines for text intensive documents. Examples of such documents include studies, reports, specifications, databases, operations and maintenance manuals, meeting minutes and correspondence. All text documents containing a table of contents (TOC) shall be indexed and hyperlinked to the first page of each section listed in the TOC Adobe's indexing function. Compound text documents not including actual embedded CADD graphics shall contain a hyper-link that will launch the viewer and display the image. Below is the list of text document types and the corresponding electronic file formats required by the electronic standards.

Text Document Formats

Text Document Types	Source Formats	Electronic Bid/ Web Formats
Simple Text	*Microsoft Word 2000	Adobe Acrobat Reader PDF 5.0
Compound Text (Small and Medium)	*Microsoft Word 2000	Adobe Acrobat Reader PDF 5.0
Compound Text (Medium and Large)	Microsoft Powerpoint 2000	Adobe Acrobat Reader PDF 5.0
Design Specifications	Microsoft Word 2000	Adobe Acrobat Reader PDF 5.0
Spreadsheet	*Microsoft Excel 2000	Adobe Acrobat Reader PDF 5.0
Presentation	*Microsoft PowerPoint 2000	Adobe Acrobat Reader PDF 5.0
Raster	JPEG	Adobe Acrobat Reader PDF 5.0
Database	*Microsoft Access 2000	Adobe Acrobat Reader PDF 5.0
Project Management (i.e. schedules)	Primavera P3	Adobe Acrobat Reader PDF 5.0

*Bundled with the Microsoft Office 2000.

1.2.5 CPM Construction Schedule Standards

The scheduling method to be used shall be a Critical Path Method (CPM) schedule in the form of an activity on node Precedence Diagram Method (PDM) with capabilities of identifying the critical path. The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractor's publication "CPM in Construction", latest edition.

The Contractor shall provide separate CPM schedule networks and sub-networks of activities for each process or facility. Each sub-network shall be assigned a code and separate activity numbering. The interrelationships between sub-networks and individual activities shall be identified.

2 CADD Standards

2.1 General CADD Information

2.1.1 Purpose

The purpose of this section is to provide CADD criteria and guidelines for all electronic CADD data produced for the PRP by All A/E/C Contractors and their Subcontractors, A/E/C contractors and their subcontractors. The PRPEDS CADD standards set basic CADD requirements that help to ensure consistency in architectural, engineering, and as-built drawings. Some key objects of this section of the standards are listed below:

- Individual drawings shall be clean and neatly organized.
- Drawings shall contain sufficient information to clearly indicate the design intent. Clarity of intent is enhanced by the use of a consistent graphical presentation.
- Related information shall be grouped together in the drawing set and be adequately cross-referenced.
- Standard drawing items such as north arrows, notes, titles, and key plan shall be placed in the same location on each drawing whenever possible.
- Consistency of "style" shall be evident across disciplines and throughout the entire drawing set.
- All drawing sets shall be produced by CADD software and shall have the same style or “look and feel”. The drawings should look as though each drawing was produced from a single source using common standards and parameters.

2.1.2 CADD Definitions

CADD and CAD - Computer Aided Design and Drafting software and hardware used in the design and production of contract drawings. Within the context of this document, *CAD* and *CADD* are equivalent terms.

CAE - Computer Assisted Engineering.

Design Sketch - Sketches that are used to illustrate design concepts or to clarify the design intent. Generally, these sketches are freehand or rough drafted studies. Where a more precise drawing is required for analysis, electronic drafting should be utilized because this system will then provide the basis for further CADD development. Design sketches are retained for the record and should include the dates; names of the originator, drafter and reviewer; as well as the disposition of comments.

Approved Drawing - A drawing that has been reviewed and approved for content by the Government as well as reviewed, and approved for issue by the A/E Design contractor.

Contract Drawing - A drawing that is included in the construction awarded package. Within the context of this document, "contract drawing", "construction drawing", and “contract document” are equivalent terms.

Controlled Drawing (Change Notice/Orders) - A drawing for which a formalized change process for revisions/updates after initial issue is required.

Drawing Index - A drawing which contains a comprehensive list of all drawings in sequential order along with the corresponding sheet number and drawing title. Large contract packages that are divided into volumes shall be labeled accordingly, and contain a drawing index near the beginning of each volume.

General Drawing - A drawing that contains general information that is applicable to the full set of drawings. Typical information contained on a general drawing include: Cover sheet / Title sheet, Index of Drawings, Location Map, Abbreviations, Symbols, Legend, General Notes, Code Analysis, Project Data.

Detail Drawing - A drawing of a larger scale and greater detail which permits a more thorough understanding of the contract documents.

Contract Sheet File - A 2D electronic drawing file prepared as the final contract drawing to create plots for construction documents. Within the context of this document, "contract drawing", "contract sheet", and “sheet” are equivalent terms.

3D Model File – CADD files that are identified by the initial letter of their names as ‘M’ contain an accurate three dimensional representation of a design. These files are not referenced directly into the sheet files. These files are included in the extraction process and the extraction files created are then referenced into the sheet files.

Extraction File – MicroStation files that are identified by the initial letter of their names as ‘E’ and are created by an extraction process from a Microstation 3D Model to represent a flat 2 dimensional plan or section view. Extraction files are referenced into the Contract Sheet files.

Reference File – CADD files that are identified by the initial letter of their names as ‘X’ and are brought in as a reference file into the Contract Sheet files. These files are not included in the extraction process.

Concept Design – 35% - The concept design submittal shall include sufficient information to represent the overall size and character of the project based on the approved schematic design.

Preliminary Design - 75% - The preliminary design submittal shall incorporate the comments of the previous submittal and shall include the refinements of the building systems as they represent the overall size and character of the project.

Pre-Final Design – 95% - The pre-final design submittal shall include all the finished design to form the complete construction documents.

Final Design - 100% - The final design submittal shall incorporate all comments resulting from the 95% submittal review.

As-Built Record Drawings - Contract drawings (hard copy and CADD) that have been modified to include all changes that have been incorporated by amendments or modifications, and additional as-built conditions as recorded by the contractor. These documents represent the official project record of the constructed or installed facilities or systems.

As-Built Documents - Drawings, specifications, or field notes that are maintained by the construction contractor and Government Resident Engineer on a regular basis to reflect the actual location of all elements of the building and all of the systems in the building.

Reference Only Drawing - A document that is provided to the contractors for reference only for the purpose of supplying information which is relevant to the design of adjacent or related project facilities or systems. Reference drawings are marked "FOR REFERENCE ONLY, NOT FOR CONSTRUCTION". Reference drawings are not required to comply with these standards . Reference drawings, in this context, do not refer to CADD reference files.

Imperial Units – The unit of measure for the contract documents, in feet and inches. In accordance with a directive from PenRen the HPCC team was permitted to do the project in Imperial units due to the compelling reason that the building was built in Imperial units as was the Phoenix reconstruction.

Shop Drawing - Detail drawings or other documents, which illustrate the individual items and components, that are utilized in the assembly of a specific item or structure and are prepared by the fabricator or vendor of those items. These documents must be checked and approved by the responsible contractor prior to their issuance to the A/E design contractor for their review.

Electronic Support Files - Files such as pen tables, color tables, cell libraries, parts libraries and plot files that are needed to produce contract drawings.

MicroStation - The CADD software program by Bentley Systems, Inc., MicroStation Triforma V8 (or higher) version, which produces the 2D and 3D design file format usually denoted with the file extension ‘DGN’. MicroStation is a registered trademark of Bentley Systems, Inc.

Cell - A cell is a complex symbol, notation, detail or group of elements (in effect, a small drawing) that can be stored in a file called a cell library, for repeated use in one or many drawings. Cells may include text and tags.

Cell Library - A file that contain cells. This file can be simultaneously shared by any number of design files, and users. The intent of cell libraries is to promote efficiency and consistency in the design process through reuse of resources.

Nested Cell - A cell that contains another cell. Nested cells are not to be used in any CAD files for the PRP.

Shared Cell - Cells placed within a drawing file that all share a single graphic definition. When a shared cell is replaced using the Replace Cell tool, all instances of the cell are replaced.

Drop Status - The operation of disassociating the graphical components from their grouping as a cell.

Terminator Cell - A cell used at the end of a linear element. The cell rotates to the angle defined by the last tangent section of the linear element. All cells can be used as a terminator.

Pattern Cell - A cell used in a repeated application along a linear element. Cells can also be used in repeated applications to pattern a closed area.

Point Cell - A cell that assumes the active symbology upon placement and is view independent. Point cells shall not to be used in any CADD files for the PRP.

Graphic Cell - A cell whose symbology is determined when created and is view dependent (rotates with the view of which it is a part).

Tags – This is the process of attaching editable text attributes to graphic elements within a design file or as a cell, which can be extracted out as a report in a comma delimited format.

2.1.3 CADD Standards

The PRP requires that all CADD deliverables be in the .DGN format. Contractors will be responsible for any translations or editing required to meet the PRP Electronic Data Standards, if they use CADD platforms other than MicroStation. Any such translation or editing must preserve the accuracy and integrity of the original CADD file.

CADD File Formats

Document Type	Source Format	Electronic Bid Statement	Web Format
CADD	Microstation V8 Triforma DGN	CALS – Group 4 Type 1 Compressed Raster, 300-400 dpi	DPR

2.1.4 History of the CADD Standards

The previous CADD standard was based on *U.S. Army Corps of Engineers (COE) Computer-Aided Design and Drafting (CADD) Systems Standard Manual* dated 30 June 1990. This standard was rescinded by the COE on 30 June 1996 and not replaced. Around the same June 1996 time period, the Tri-Service organization (Air Force, Army, and Navy) published a pre-

final draft of a new CADD standard called *Tri-Service A/E/C CADD Standards*. For these and other reasons, the PRPEDS CADD standards are based on the *Tri-Service A/E/C CADD Standards*.

The PRPEDS was used as a basis for the current EDS in order to maintain consistency between the existing drawing files prepared for the Wedge-1 project and the drawing files being prepared for the Wedges 2-5 project.

2.2 Coordinate System and Building Orientation

2.2.1 Maryland State Coordinate System

The MSCS has been chosen as the common orientation and coordinate system for the PRP. The MSCS was chosen as the standard coordinate system because all the monumental government buildings in the NCPC are on the MSCS as well.

The MSCS data for all disciplines are recorded below.

Lambert Conformal Conic (Two Parallel):

Origin Latitude: 37° 50’ 0.00000” N	False Northing: 0.000	Parallel One: 39° 27’ N
Origin Longitude: 77° 00’ 0.00000” W	False Easting: 800,000.000	Parallel Two: 38° 18’ N

2.2.2 Geographical and Non-Geographical Drawings

Contract drawings are categorized into two major types: geographical and non-geographical. This distinction is made because there are some differences that occur when setting up and plotting each.

Geographical oriented drawings are those produced by Civil, Right-of-Way and Utilities disciplines and map on a one-to-one basis between these disciplines. Non-geographical drawings consist of plan, building, or model files wherein the drawing elements describe the spatial relationship of plans, elevations and sections with reference to established monument points for each project.

The location of objects with respect to ground coordinates, and the MSCS is critical. A/E/C contractors must maintain access to the MSCS for the life of the project and in all contract document files.

2.2.3 Global Origin

Positioned within the 3D model design files is a global origin. A design file's origin is important because it serves as the point from which all other elements are located and also confirms that all Triforma 3d elements including 3d Solids are within the area limited by the Trforma solids cube area predefined in MicroStation. Global Origins are typically defined (located) in a design file by

the Cartesian coordinate system. The benefits of standardizing the location of a drawing's origin is most notable in the use of reference files where drawings must conjoin and in design disciplines, particularly mapping, where the origin's location determines the available drawing area. All reference files shall be brought in with Orientation as Coincident. The 3D model files must align with their common global origin. The global origin in this project is also used as the center of the designed coordinate points of the Pentagon (equal arm lengths and angles) defined in the MSCS as X= 1,296,445.970', Y= 438,624.437', Z= 0.0'.

2.2.4 PRP Monument Point

The PRP monument point is a National Geodetic Survey (NGS) brass disk benchmark set by the US COAST & GEODETIC SURVEY stamped "PENTAGON 1942" having a published NGVD 1929 elevation of 38.62 feet. The benchmark is located near the center of the south loading dock inside the building near the first column at an elevation of 38'-7.5"

Note: "Z" is defined as the elevation 0.00 feet above the National Geodetic Vertical Datum (NGVD) of 1929 or mean sea level so that all points in the CADD environment will read as positive numbers. The approximate coordinate locations (See NGS Data Sheet) are as follows:

PRP Monument Point (North and East)		
X	**Y**	**Z**
395050.5 E	133513.0 N	38'-7.5"

PRP Monument Point (Latitude and Longitude 1927)			
Direction	**Degrees**	**Minutes**	**Seconds**
Latitude North	38	52	10
Longitude West	77	03	25

2.2.5 Pentagon Coordinate Points

2.2.5.1 SURVEY and DESIGN Coordinate Points

In addition to the PRP Monument Point benchmark, five survey points of the Pentagon have been established. The assumption here is that these points are to the exterior face of the wall above ground foundation at the center of each apex.

Note: The original survey points were taken based on the Virginia State Coordinate System using NAD 27 with units of feet-inches. The Government has converted this data to metric and mapped to MSCS using the CORPSCON V4.12 conversion program and then converted the data for MSCS imperial units. The Survey MSCS points are defined in the following chart for records.

All disciplines shall use the Design Coordinate Points as defined in the chart below for preparing Construction Documents (drawings, 3d models etc.). The design coordinate points have been established by holding the Wedge 2 corner of the 2002 Survey coordinates as the common point and developing a geometrically perfect Pentagon shape for design and construction purposes. The assumption made is that the exterior face of the wall above ground is 18 inches outside the structural column grid 'A' in all directions. The 5 corners (apex) and the center of the Pentagon are defined by the Design Coordinate Points in the following chart.

PENTAGON APEX	DESIGN COORDINATE POINTS	2002 SURVEY MSCS POINTS
Wedge One	N 438,279.940	N 438,279.498
	E 1,295,739.608	E 1,295,740.388
Wedge Two	N 439,189.735	N 439,189.735
	E 1,295,899.842	E 1,295,899.842
Wedge Three	N 439,318.486	N 439,319.366
	E 1,296,814.624	E 1,296,814.619
Wedge Four	N 438,488.263	N 438,489.271
	E 1,297,219.756	E 1,297,220.802
Wedge Five	N 437,846.406	N 437,846.628
	E 1,296,555.360	E 1,296,556.742
Center	N 438,624.566	
	E 1,296,445.838	
Centroid		N 438,624.907
		E 1, 296,446.500

2.2.5 Pentagon Floor Elevations

The following chart shows the top of slab elevations for each of the floors in Pentagon.

Pentagon Floor Elevations	
Floor Name	**Elevation (Z)**
Fifth Floor	88.00 feet
Fourth Floor	76.62 feet
Third Floor	65.25 feet
Second Floor	52.79 feet
First Floor	38.71 feet
Proposed Mezzanine Floor	26.98 feet
Proposed Basement Floor	15.91 feet

2.3 CADD File Organization

2.3.1 Project Folder Structure

The main project folder is defined by the three-letter Project Identifier (ie. A80) issued by the Government. Under the main project folder there shall be discipline specific folders defined by the discipline designator (ie. A80C, A80E). Each discipline designated folder shall contain all contract drawing files including related 3d models and support files for that discipline. If additional discipline designated folders are needed for a project, the Government must be notified in writing for approval.

See Folder diagram on Appendix C, Exhibit A.1.

2.3.2 3D Design File Organization

The 3D design file organization demonstrates the steps and the work process from 3D models to the final contract sheets.

See File Organization diagram on Appendix C, Exhibit A.1.

2.3.3 3D Model Files

3D Model Files starting with the letter 'M' is an accurate three dimensional representation of the design. The 3D model shall be used as the primary source to develop the contract sheets for Plan views. All 3D Model files shall be included in the extraction process. 3D Model files shall not be referenced directly into the Contract Sheets. The smallest module of a 3D model file shall be one area per wedge per floor of the PENTAGON. Therefore, each wedge shall have nine 3D model files per floor, typical Wedges 2, 3, and 4. (Basement and Mezzanine levels may consist of fewer 3D model files according to the building layout). Each of these 3D model files shall be referenced to create a complete 3D model.

2.3.4 Extraction Files

Extraction files (a flat 2D representation view in a direction) starting with the letter 'E' are created by electronically processing designated section marks placed on 3D model files. The extraction files shall be referenced into the contract sheet file for plotting. All extraction files shall be referenced to the sheet file as individual models using the default filename as the logical name. All reference shall be brought with ORIENTATION=Coincident, SCALE=1:1 (True Scale), NEST=0. A separate extraction file shall be made for each plane view. No work or editing shall be done on the extraction files but shall be on the related 'M' files. A new extraction shall be done from the updated 'M' files to replace the earlier extraction file and update the Contract Sheet.

2.3.5 Reference Files

Reference files starting with the letter 'X' shall be referenced into the Contract Sheets and shall not be included in the 3D Model extraction process.

A/E/C contractors shall use reference files to eliminate or reduce graphic data redundancy whenever possible. Use of reference files is important for efficient use of CADD and in assuring coordination both within a discipline and between disciplines. This is of particular importance in PRP projects where interrelated components are designed by teams under many separate contracts.

All reference files must be system and network directory structure independent when referenced to contract sheet files. Therefore, no files shall be referenced using a technique or function that

results in the hard coding of the path of a reference drawing (i.e. do not enable the 'save full path' option when attaching a reference file).

Similarly, within a discipline files should be structured so that large scale detail information can be added to clipped portions of the design file plan, section, and elevation information. In this way, changes in the basic information are reflected throughout the contract set.

Inter-discipline plan files shall be attached with Orientation as Coincident and without scaling or repositioning and reorientation in the Design Model. If a rotated plot view is required the user shall attach the design file coincidentally in the Design Model and then rotate the view in the Plot Model to the desired orientation. The border shall be attached in the Plot Model. All reference file clipping shall be done in the Plot Model.

All files referenced in a project must reside in sub-folders (assigned for each discipline's drawings) within the main project folder to ensure a complete archive of the project. Each discipline shall list it's drawings per contract and the reference files as shown in Appendix C, Exhibit A.1. The DGN folder for each Discipline folder shall contain all it's contracts sheets and related reference files including the related reference files from other disciplines.

Contractors shall not enable the "Save Full Path" option when attaching the reference files because this causes the relationship of the active files and reference files to be site specific. Enabling the "Save Full Path" option also prevents files from being moved to different sub-directories should the need arise.

If it is necessary to define logical names when attaching reference files then the contract file name shall be used as the logical name using lower case letters. If a reference file has to be attached to the same active file more than once, simply add a pair of parenthesis "(#)" with a number indicating the occurrence of that file. For example, when the file **xa81af01.dgn** is attached to **a81af02.dgn** the first time, the logical name will be **xa81af01**. If it is attached a second time, its logical name will be **xa81af01(2)**. If it is necessary to add a description then add a hyphen after the contract file name and then add a short description in the logical name.

All reference files temporarily attached to the sheet shall have a logical name 'TEMP-01, TEMP-02, TEMP-03 etc. All temporary reference files shall be detached from all contract sheet files before being submitted to the Government.

When attaching a reference file, it is optional to fill in a complete description of the file that is being attached. However, if the contractor does decide to use this field, all reference files must contain the contract drawing title of the file that is being attached (e.g., ELECTRICAL PLAN - FIRST FLOOR) including the Wedge number. Descriptions for temporary reference files should indicate the reason the reference has been temporarily attached.

2.3.6 Contract Sheet Files

Contract sheet files starting with the letter 'A' are DGN files that contain information representing a contract drawing for plotting. Sheet files shall have VIEW 1 as the TOP view, VIEW 2 as the Isometric view, View 3 as the Front view and VIEW 4 as the Right view. Views

5, 6, 7 & 8 may be used for other custom views as necessary. All related reference files ('X' or 'E' files) shall be referenced to the sheet file in the model named 'DESIGN MODEL' using the default filename as the logical name. All reference shall be brought with ORIENTATION=Coincident, SCALE=1:1 (True Scale), NEST=0. Do not scale LineStyles (uncheck the box under options). Once all references are brought in then the sheet file shall be referenced to itself (self reference) with NEST=1 with SCALE as needed in the model named 'PLOT MODEL' using the same sheet file name as the logical name in VIEW 1 (which will be the TOP view). The Border file (xa80gb01) shall be referenced into this model with ORIENTATION=Coincident, SCALE=1:1 (True Scale), NEST=0. Multiple self reference with NEST=1 may be made to create multiple views at different scales on the Plot Model as necessary. This model named 'PLOT' shall be the final Contract Sheet view and shall be used for plotting. See exhibit A.? Each sheet file in the plot set shall be assigned a three digit Plate Number starting with 001 by the sequence in which the sheets will be organized. All annotations, dimensions and notes shall be placed on the Contract Sheet files.

2.4 Border File

The standard PENREN border file '**xa80gb01.dgn**' (see reference file naming section) shall be used and referenced into the contract sheets for the entire project. The border file contains information that does not change throughout the project. Existing elements in the border file should not be modified. However, additional elements that will need to show on all drawings may be added to the border file if necessary. This file shall be referenced into the Plot Model of the Contract Sheet with ORIENTATION=Coincident, SCALE=1:1 (True Scale), NEST=0.

2.5 CADD File Identification

2.5.1 CADD File Naming Syntax

Naming conventions for CADD files assist CADD users in determining the contents of a file without displaying the electronic file. They also provide a convenient and clear structure for organizing drawing files within project sub-directories. The naming conventions provided within this manual are based on a twelve-character file name limitation required by PENREN. File names and extensions will be in lower case eliminating potential conflicts on UNIX file systems that differentiate upper and lower case characters. The file name components are as follows:

(1) Project Identifier
(2) Discipline Designator
(3) Discipline Modifier
(4) Sheet/Drawing Number
(5) New Sheet Identifier
(6)File Name Delimiter
(7) File Extension

Detailed information about the CADD file naming syntax is given below:

2.5.1.1 Project Identifier

All files used in producing a contract drawing must have the correct project identifier. Counting from left to right, the first three characters of every file must be the project identifiers that are assigned to every project by the Government. A listing of current project codes is provided in Appendix C, Exhibit A.1. These codes are issued on a project-by-project basis. For example, the "**a81**" in **a81**af01_.dgn is the project identifier for the contract drawing set.

2.5.1.2 Discipline Designator

The fourth character of every file name must identify the discipline designator. For example, the "**a**" in a81**a**f01_.dgn identifies an "architectural" file. A listing of discipline designators is provided in Exhibit A.3.

2.5.1.3 Discipline Modifier

The fifth character of every file name must identify the discipline modifier. The discipline modifier identifies a type of drawing within a major discipline designator (the fourth character). For example, the "**d**", in a81a**d**01_.dgn identifies a "demolition" file. A listing of discipline modifiers is provided in Exhibit A.3.

2.5.1.4 Sheet Number

Characters six and seven are numbers between 0 and 9. The sheet number is a number ranging from 01-99. The first file within a modified discipline (e.g., "ad") shall begin with 01. For example, the "**01**" in a81ad**01**_.dgn is the first sheet in the architectural demolition section of drawings. For floor plans, the first digit is the floor and the second digit the area. In a81af52_.dgn, 52 is 5th Floor, area 2.

2.5.1.5 New Sheet Insert Identifier

The eighth character is the underscore "_", the only non-alphanumeric character allowed in file names. This character is changed only if it becomes necessary to add sheet(s) late in the project, (i.e.. after the original project drawing index has been published). The underscore shall be replaced with a character starting with "**a**", sequentially to "**z**". For example, if you needed to insert a new sheet(s) between a81af01_.dgn and a81af02_.dgn, the new file name will be a81af01**a**.dgn. It should be noted that the file a81af01a.dgn is not a revised version of a81af01_.dgn file, but it is an entirely new sheet.

Note: The Tenant Sheets shall be named using the new sheet identifier so these sheets can be placed immediately after the Core & Shell 1/8 inch scale plan sheets of the same area. Since the total numbers of Core & Shell plan sheets are pre-determined, there should not be a need to use this New Sheet Insert Identifier for any insert other than the related Tenant Sheets.

2.5.1.6 File Name Delimiter

A period (.) shall be used to separate the file name from the three character file extension.

2.5.1.7 File Extension

All contract drawing files shall have the file extension 'DGN' after the file name delimiter '.' Separating it.

2.5.1.8 3Dmodel File Name

All 3D files that will be included in the extraction process shall have a name starting with 'M' for example 'ma80a_23.dgn' where the prefix 'm' indicates that it is a 3D model file which will be extracted and referenced into a Contract Sheet. The next three characters are the 'a80' which is the project ID. The next prefix 'a' is the discipline designator. The next prefix '_' is the discipline modifier which is left blank. The next prefix '2' indicates the floor level. The last prefix '3' indicates the area 3 (Each wedge is divided in 9 areas). 'M' files shall not be referenced into the Contract Sheet files.

2.5.1.9 Extraction File Name

All extraction files shall be created by an extraction process from the 'M' files and shall have a name starting with 'E', for example 'ea80af03.dgn' where the prefix 'e' indicates that it is an extraction file. The next three characters are the 'a80' which is the project ID. The next prefix 'a' is the discipline designator. The next prefix 'f' is the discipline modifier with 2 digit numbers at the end. On the 1/8" scale Floor and Reflected Ceiling Plans the last 2 digits indicate the floor level. For example 'ea80af0b.dgn' indicates that it is the basement level. All extraction files shall be referenced into the sheet files.

2.5.1.10 Tenant Extraction File Name

All contract tenant extraction files be created by an extraction process from the 'M' files and shall have a 9 character name for example 'ea80af23a.dgn' where the first prefix 'e' indicates that it is a extraction file. The next three prefixes 'a80' are the project ID. The next prefix 'a' is the discipline designator. The next prefix 'f' is the discipline modifier. The next prefix '2' indicates the floor level, the next prefix '3' indicates the designated area on that wedge (each wedge is divided into 9 areas). The last prefix 'a' shall indicate a tenant partition layout. The last prefix 'b' shall indicate a tenant furniture layout. These tenant extraction files shall be referenced into the tenant contract sheets.

2.5.1.11 Reference File Name

All base reference files shall have a name starting with 'X' for example 'xa80af03.dgn' where the prefix 'x' indicates that it is a reference file. The next three characters are the 'a80' which is the project ID. The next prefix 'a' is the discipline designator. The next prefix 'f' is the discipline

modifier with 2 digit numbers at the end. On the 1/8" scale Floor and Reflected Ceiling Plans the last 2 digit indicates the floor level. For example 'xa80af0b.dgn' indicates that it is the basement level. All base reference files will be referenced into the sheet files.

When attaching reference files, the contract file name (lower case) shall be used as the logical name. If a reference file has to be attached to the same active file more than once, simply add a pair of parenthesis "(#)" with a number indicating the occurrence of that file. For example, when the file xa81af01.dgn is attached to a81af02.dgn the first time, the logical name will be xa81af01. If it is attached a second time, its logical name will be xa81af01(2).

Note: All reference files temporarily attached to the sheet shall have a logical name 'TEMP-01, TEMP-02, TEMP-03 etc. All temporary reference files shall be detached from all contract sheet files before being submitted to the Government.

When attaching a reference file, it is optional to fill in a complete description of the file that is being attached. However, if the contractor does decide to use this field, all reference files must contain the contract drawing title of the file that is being attached (e.g., ELECTRICAL PLAN – FIRST FLOOR) including the Wedge number. Descriptions for temporary reference files should indicate the reason the reference has been temporarily attached.

2.5.1.12 Tenant Reference File Name

All contract tenant reference files shall have a 9 character name for example 'xa80af23a.dgn' where the first prefix 'x' indicates that it is a reference file. The next three prefixes 'a80' are the project ID. The next prefix 'a' is the discipline designator. The next prefix 'f' is the discipline modifier. The next prefix '2' indicates the floor level, the next prefix '3' indicates the designated area on that wedge (each wedge is divided into 9 areas). The last prefix 'a' shall indicate a tenant layout plan. The last prefix 'b' shall indicate a tenant furniture plan. These tenant reference files shall be referenced into the tenant contract sheets.

2.5.1.13 'Contract Sheet' File Name

All contract sheet files shall have 8 character name for example 'a80at23.dgn' where the first three prefixes 'a80' are the project ID. The next prefix 'a' is the discipline designator. The next prefix 'f' is the discipline modifier. The next prefix '2' indicates the floor level, the next prefix '3' indicates the designated area on that wedge (each wedge is divided into 9 areas). The last prefix is the '_' (underscore).

The eighth character is the underscore "_", the only non-alphanumeric character allowed in file names. This character is changed only if it becomes necessary to add sheet(s) late in the project, (i.e.. after the original project drawing index has been published) anywhere in the drawing set except for the 1/8" scale floor plan sheets (reserved for tenant sheets, see contract tenant sheet file name). The underscore shall be replaced with a character starting with "**a**", sequentially to "**z**". For example, if it is necessary to insert a new sheet(s) between a81at01_.dgn and a81at02_.dgn, the new file name will be a81at01**a**.dgn. It should be noted that the file a81af01a.dgn is not a revised version of a81at01_.dgn file, but it is an entirely new sheet.

2.5.1.14 Tenant 'Contract Sheet' File Name

All contract tenant sheet files shall have 8 character name for example 'a80at23a.dgn' where the first three prefixes 'a80' are the project ID. The next prefix 'a' is the discipline designator. The next prefix 'f' is the discipline modifier. The next prefix '2' indicates the floor level, the next prefix '3' indicates the designated area on that wedge (each wedge is divided into 9 areas). The last prefix 'a' shall indicate a tenant layout plan (layout varies per discipline). The last prefix 'b' shall indicate a tenant furniture (varies per discipline) plan. These tenant sheets shall be placed immediately after the respective 1/8 inch scale Core & Shell plan sheets (each sheet representing 1 of the 9 areas per wedge per floor with 1/8 inch scale drawing) for the same floor level and same area plan.

2.5.1.15 Cell Library Name

Each discipline shall have their own cell libraries and the 8 character name shall reflect the discipline to allow sharing the libraries with other disciplines.

The cell library name syntax shall be as follows: The first 3 prefixes shall be the project identifier, the next prefix shall be the discipline designator, the next prefix shall be the discipline modifier and then the last three prefixes shall be a sequence of 3 digits. For example a cell library named 'A80AF001.cel' shall indicate that it holds the cells for placing on the architectural floor plans. An index of cell libraries shall be prepared by each discipline to list all the cell library names and their descriptions.

2.5.1.16 Cell File Name

Individual cell files with the file extension 'DGN' shall be created when necessary with a 5 character name. The first character shall be the Discipline designator, the second character shall be the Discipline modifier, and the last three characters shall be a 3 digit number identifier (example: af100.dgn) . The cell will have a discipline modifier based on the destination where it will be placed. For example if creating a cell for ceiling diffuser it should be named by the discipline modifier 'C' because this cell is created to be placed primarily on a ceiling plan. If the same name is maintained, it can be used for other destinations. An index of individual cells shall be prepared by each discipline to list all the cell names and their descriptions.

2.5.1.17 3D Model Family and Parts Name

Parts for 3D models shall be created under the family name as designated in the UNIFORMAT followed by a logical description by the discipline.

2.5.2 Cross Reference identification between Contract Sheet Files

When pointing to a specific sheet (for use in the drawing title block, details, section bubbles, reference bubbles, etc.), use the discipline designator and discipline modifier with the sheet number separated by a hyphen. If the file name contains a "new sheet inserted identifier," simply append the letter to end of the sheet number. If the sheet number is between 01 and 09, remember to include the leading 0 in the sheet number. For example, if the file name is a81af01a.dgn, the sheet reference number is af-01a. If the sheet number is too large to fit in the bubble, break the bubble so the sheet number extends outside the bubble.

2.6 CADD File Settings

2.6.1 CADD Application Version

MicroStation V8 or higher version (officially released) shall be used in the project. Penren shall be informed of the current version as well as any new released version adopted for the project immediately. New released versions of CADD applications adopted for the project shall be compatible with the application versions used by other disciplines.

2.6.2 Graphic Scales

Imperial graphic scales shall be used as indicated in Appendix C, Exhibit A.5.

2.6.3 Views

The default view on the sheet files shall be the model named 'PLOT MODEL' which is the top view of the plotting model.
On the 3D model files, View 1 shall be the Top view by default, VIEW 2 the Isometric view, View 3 the Front view and VIEW 4 the Right view. Views 5, 6, 7 & 8 may be used for other custom views as necessary

2.6.4 3D Design File Settings

The tables below show the MicroStation 3D Design File settings.

MicroStation Design Settings		
Active Settings		
Active Settings	**Non-Geographic**	**Geographic**
Active Angle	0.00 degrees	0.00 degrees

Active Scale	1,1,1 (x,y,z)	1,1,1 (x,y,z)

MicroStation Design File Setting		
Coordinate Readout		
Coordinates	**Non-Geographic**	**Geographic**
Coordinates Format	Sub Units	Master Units
Coordinates Accuracy	1/16	0.0
Angles Format	DD.DDDD	DD.DDDD
Angles Mode	Conventional	Conventional
Angles Accuracy	0.12	0.12

MicroStation Design File Setting		
Working Units		
Unit Names	**Non-Geographic**	**Geographic**
Master Units (MU)	'feet' (Label ')	'feet' (Label ')
Sub-units (SU)	'inches' (Label ")	'feet' (Label ')
Resolution	304,800/foot	304,800/foot
Working Areas (Total)	5596814 miles	5596814 miles
Working Areas (Solids)	2.668769 miles	2.668769 miles
Solids Accuracy	1.40911E-007 ft	1.40911E-007 ft

2.6.5 Level Symbology

Level symbology shall be used only on the sheet files and when the need arises to alter the native color of elements in an attached reference file. Typically this is needed to de-emphasize background drawing elements. Level symbology shall not be used for elements on the active design file.

2.7 Support Files

Support Files shall be made available for reference only. The support files (for example Plotter Driver information, Level Names) may be modified in conformance to the related sections of this

document based on the specific hardware and software, applicable to the project. The URL address for the Support Files shall be provided by PENREN.

DESCRIPTION	*URL FOLDER	FILE NAME
Standard Penren Border File.	\border	XXXX.dgn
Cell library contains cells usually used in design files as well as on sheet files.	\cells	XXXX.cel
Plotter driver file is a text file that defines all the necessary information to create a monochrome plot file.	\drivers	XXXX.plt
Pen table used to symbolize the plot file based on element color criteria and a set of output actions.	\pen tables	XXXX.tbl
DGNLIB files contain a standard set of levels and their symbology on which elements are placed. DGNLIB file also contains the standard Dimension and Text styles for the project.	\dgnlib	XXXX.dgnlib
The color table determines the correspondence between the 256 color attribute values and display colors (RGB).	\colortables	XXXX.tbl
Tag set library that contains tags associated with data stored in the design file that are attached to graphical elements.	\tagtables	
Seed Files contain default settings in a design file	\seed	XXXX.dgn

2.7.1 Seed Files

AEC contractors shall use seed files approved by the Government when creating contract files. By standardizing file design settings according to discipline standards, each user within a discipline and project will enter a file that is uniform.

The seed file shall define other default settings (i.e. views, working units, locks, active level, weight, color, snaps, grids, background color, etc.) in addition to the variables set in the configuration files.

2.7.2 Color Table

The variety of colors available in a CADD application depends on the capabilities of the computer monitor and its video card. Today, most systems are capable of displaying from 16 to 256 colors. However in this standard the MicroStation delivered color table has been used as the

default color table. It is important to note that the number assigned to each color is important for plotting, not the appearance on the screen. The standard color table shall be used by all disciplines for the project.

2.7.3 Cell Libraries and Cells

Each discipline shall maintain an index of the names and descriptions of all their cell libraries. The cell libraries and cells shall be shared between the disciplines as necessary. Tags shall be listed as part of the cell libraries or cells. When creating a 3D cell or compound cell the 2D plan representation of that object shall be 1/16" in front of the adjacent design plane i.e. floors, walls, ceilings so that it will show correctly on extractions.

2.8 Level Definitions

To effectively use and manipulate building and drawing information, the Government has attempted to define its name and its use. All contract drawing files produced by or for the Government shall conform to the PRP leveling standard. Proper planning and execution of a leveling standard is essential for maximizing productivity and isolating graphical and textual information. Government discipline leveling assignments are provided in Exhibit A - CADD Level Assignment Tables. Those preparing CADD documents for the PRP shall follow these guidelines in the preparation of contract drawings.

Periodically the Government leveling assignments may be appended. Such changes will not affect the previously approved plans, unless a specific instruction is included.

CADD levels are analogous to overlays in manual drafting systems and serve to separate graphic elements (lines, shapes, and text) according to the design discipline they represent. The types of information represented by individual levels can be grouped into two primary types: building (object-oriented) information and drawing information.

2.8.1 Building Information

Building (object) information represents the physical form of a site, a building, or objects composing a building. This information is often shared between drawings. Examples include walls, doors, light fixtures, and room numbers. Building information may be either literal (e.g., walls) or symbolic (e.g., electrical outlets).

2.8.2 Drawing Information

Drawing information may include notes, annotated symbols, dimensions, and cross references to a drawing. This type of information is usually not shared between drawings.

2.8.3 Level Naming Conventions

The name format for each level is composed of a Discipline Designator, a Major group, a Minor group and a modifier. See Appendix B-1. Approved levels and their symbology shall be included in a discipline specific DGNLIB file for standard level use.

2.8.4 Level Name Syntax

The level naming methodology used in these standards is developed based on level naming system in the National CADD Standards, version 2.0, dated 2001.

- Discipline Designator - One character in length. This categorization organizes the levels into designated design disciplines (i.e. 'A' for architectural, 'S' for structural, 'E' electrical).

- Major Group - Four characters in length. Generally, Major Groups designate objects, assemblies, or construction systems such as walls, doors, ceilings, or electrical power systems.

- Minor - Four characters in length. This field is for further differentiation of Major Groups such as distinguishing full height walls from partial height walls or emergency lighting from general lighting.

- Modifier (optional) – Four characters in length. This optional field may be used to accommodate additional attributes such as 'Demo' for demolition, 'Exst' for existing.

2.8.5 Level Assignment Tables

All the currently acceptable level names are listed in the level assignment tables in Appendix B. A detailed definition for each level, color and level style is shown in the table.

2.9 Dimensioning

2.9.1 Dimension Setting

The following specifications for dimensioning shall be adhered to by all disciplines:

- Dimension Text Height = 3/32"

- Dimension Text Width = 3/32" x 0.8 = 24/320"

- Text Font = 1

- Terminator Width = ratio 1:1 of Dimension Text Height

- Terminator Height = ratio 1:0.5 of Dimension Text Height

- Terminator style = Architectural Tick
- Units:
  - Format = AEC
  - Primary = Imperial
  - Accuracy = 1/8”
  - Label = MU label – SU Label
  - Alternate Label (checked) = If distance is > 100:0 MU
  - Scale Factor = 1
  - Unit Format:
  - Primary - “check box” for Show Trailing Zeros

2.9.2 Dimensioning Styles

Dimension Styles shall be saved in the DGNLIB file.

2.9.3 Dimensioning in Imperial

Typically, the unit of measure for contract documents work will be feet and inches. However, site plans or other drawings drawn to scales over 1”=32’ should use the foot with decimals (master unit) as the unit of measure.

2.10 Text

Text requirements for notes, dimensions, titles, and headings, shall be standardized for CADD usage. All text is to be input accurately and placed in the file for legibility. The "fitted text" style shall not be used. All text shall be uppercase with lowercase utilized only in approved symbols. All text shall be associated with certain levels that will define the color of the text. The text will plot with a line weight assigned by the color in the pen chart. No text, notes or keynotes shall be placed on the Plan reference files except for the Room Names and Number Tags and other essential information that needs to be associated with the Plan reference files. Place all annotations, notes, keynotes on the Plot Model of the Sheet File.

2.10.1 Text Justification

Left-bottom justification is the default text justification setting for all annotations and notes on the drawing.

2.10.2 Text Fonts

Text styles or fonts are used within a drawing to delineate types of information. To produce very readable contract documents the fonts described below should be used.

Text Type	Font	Height	Example/Usage
Date Stamps Border Grid No.	Font #1 Font #1	3/32” 3/32”	This font creates text where the characters are proportionally spaced. It is appropriate for text used in date stamps and border grid numbers
Legend & plan notes Legend sub-titles Plan drawing titles and section/detail Titles	Font #1 Font #1 Font #1	3/32” 5/32” 3/16”	This font creates text where the characters are proportionally spaced. It is appropriate for general notes, labels, and title blocks.
Schedules	Font #1	3/32”	This font creates text characters that are evenly spaced. It should be used where text fields need to line up such as in schedules or title blocks.
Large Cover Sheet Text	-	-	Filled fonts are used primarily as titles and on cover sheets.
Annotations Notes Keynotes	Font #1	3/32”	Use in Annotations, Notes and Keynotes on the Plot Model of the Sheet File

2.10.3 Drawing Title Block Text

The drawing title block text has been created using the following specifications:

- Revision text shall be 3/32” in height and a font 1
- Project Name and Address text shall be 3/16” in height and a font 1.
- Discipline shall be 3/16” in height and a font 1.
- Sheet Title text shall be 3/16” or larger and a font 1

- Project Number text shall be 3/16” in height and font 1
- Contract No./Delivery Order No. shall be 3/16” and font 1
- Scale, Date, Plate and Sheet text shall be 3/16” and font 1

2.11 Element Characteristics

2.11.1 Line Weight

The weight of all elements in the CADD file shall have a default monitor display weight of zero ("0").

2.11.2 Pen Widths

The colors and related pen widths are defined in Exhibit A.6 and are also included in the Level definitions of the DGNLIB file.

2.11.3 Line Styles

The line styles used are the default MicroStation linestyles as follows:

0 (continuous), 1 (dotted), 2 (medium-dashed), 3 (long-dashed),

4 (dashed-dotted), 5 (dashed- space), 6 (dashed double-dotted),

7 (long-dashed short-dashed)

If additional styles will be required they must be submitted to the Government for approval.

See Appendix C, Exhibit A.8

2.12 Border File

Government Approved Border file shall be used for the project. See Exhibit A.3. The shape on level ‘G-SHBD-OTLN’ in the border file shall be used to define the extents for plotting the contract sheet files.

2.13 Plotting

Approved plotter drivers and pentable shall be used for consistent plotting.

2.13.1 Plotter Drivers

Approved plotter drivers shall be used for setting the plotting parameters.

2.13.2 Pen Tables

Approved plotter drivers shall be used for setting the pen parameters.

2.14 Requirements for Electronic Delivery

2.14.1 CADD Deliverables

All contract sheet files with related data files and support files ie. seed file, level files, color table, pen table, cell libraries, cell files, part libraries, script files etc. shall be delivered to the government.

CADD Deliverable File Formats

Document Type	Source Format	Electronic Bid Set Format	Web Format
CADD	MicroStation V8 (or higher) Triforma File extension 'DGN'	CALS-Group 4, Type 1, Compressed Raster, 300-400 dpi File Extension 'CAL'	Digital Print Room File Extension 'DPR'

2.14.2 Delivery Media Preparations

Before a file is placed on the delivery digital media, the following procedures should be performed:

- Remove all extraneous graphics outside the border area, and set the active parameters to a standard setting or those in the seed file.
- Make sure all reference (external reference) files are attached without device or directory specifications.
- Include all files, both graphic and non-graphic, required for the project (e.g., color tables, pen tables, font libraries, cell libraries, user command files, plot files, etc.).
- Document any nonstandard fonts, tables, etc., developed by the user.

2.14.3 Labeling Delivery Media

When exchanging digital media, an external label should contain the following information:

- Project Name

- CD Title (A short description of the media contents. In addition, a transmittal sheet should accompany).
- Submission Date
- CD Creation Date
- Contract Number
- A CD Sequence number (CD# A80-092602-I of VI) where A80 is the project ID, 092602 is the date of submittal and I of VI indicate that the total number of CD's in the set.
- Contractor's Name
- IRC Project Number (if applicable)

2.14.4 Delivery Media Information

The delivery media shall include Disclaimer and Readme files which should contain the following information:

- Format and version of the operating system in which the media was created (e.g., Windows 2000).
- Certification that all delivery media is free of known computer viruses, including the name(s) and release date(s) of the virus scanning software used.
- Refer to PenRen Security Classification Guide, Program Manager's Directive #02-02 or a later version for classifying media and documents for distribution.

2.14.5 Delivery Media

CD or DVD shall be used to submit electronic files to PRP. No file compression utilities shall be used for deliverable data to the PRP.

2.15 CADD Standards Compliance

The PenRen Office Information Resource Center department is responsible for assisting the EDS IPT with determining whether or not CADD and text document deliverables meet the PRPEDS. Information Resource Center will randomly sample a minimum number of CADD files from each submission.

2.15.1 A/E/C Quality Control Plan

Contractors providing data shall be documented and have a Government approved quality control program to assure compliance of sub-contractor's data for interim submittals and final delivery of data.

The Government uses anautomated checking procedure, screen checking and plotting to verify PRP CADD standards compliance. A sample of the CADD Review Checklist is provided in Exhibit A.1. All data not conforming to the standards shall be returned for correction to meet the CADD standards as described herein. Interim submittal files shall be corrected and re-submitted according to the terms of the A/E/C contractors' contract. Where checking indicates procedural problems, the contractor shall take immediate remedial action. Rejected final submittal files shall be fixed and returned within a time period specified in A/E/C contractors contract.

The Government, as a final data verification procedure, generates plots of all data submitted by contractors, using Government equipment and automated procedures. The Government generated plots are compared with the corresponding contract drawings produced and submitted by the contractor and must exactly match them in appearance and content before the data delivery is accepted.

Because of the nature of evolving computer technology, software program changes or updates may affect specific requirements of these standards or the procedures for managing data. Contractors shall review changes in requirements received during the course of design and advise of cost and schedule impacts on a contract. Changes impacting cost and schedule shall be executed according to written instruction provided by the Government Project Manager.

2.15.2 CADD Software

The MicroStation 3D design file format has been selected as the CADD source format for all PRP electronic CADD deliverables. All submitted CADD files will be verified using Bentley System, Inc., MicroStation Triforma V8 (or higher).

All electronic CADD data submissions shall be delivered in the format(s) listed in this standard. Any translation and processing required for compliance with the accepted format(s) shall be the originator's responsibility.

3 Text Document Standards

3.1 Purpose

The purpose of this section is to provide guidelines for all electronic text based documents produced by A/E/C contractors and their subcontractors. The PRPEDS document standards set basic requirements that will ensure consistency in electronic deliverables to the Pentagon Renovation Program. Examples of such text documents include studies, reports, specifications, databases, operations and maintenance manuals, meeting minutes and correspondence.

These electronic standards require that all text document deliverables be submitted electronically in a *source,* an *electronic bid* and a *web* format. The source file allows the government to reuse, edit, or otherwise manipulate the contents of the file except where the original file is a raster image, as in the case of product literature. The electronic bid format is best suited for creating electronic bid sets which reduces the cost of distributing hard copy. The web format allows documents to be accessible, viewed and printed via the World Wide Web.

These business information documents may be produced using computer-based software programs or by some other method. These documents must be submitted in a native file format of software programs approved by the Pentagon Renovation Program, or in an approved industry-standard data format.

Text documents may be produced using a combination of software programs and a combination of native or industry-standard data formats. Following is a list of approved electronic data deliverable formats.

3.2 Document Cover Standards

Document Cover Standards apply to two principal types of documents: reports and specifications. The format typically used for a Specifications Cover is used for the Flysheet of Reports.

3.2.1 Report Covers

The Cover for Reports may include a graphic image approved by the prime A/E and reproducible in black and white. The following information is to be included on the cover of each Report or Study:

Title of Study
Pentagon Renovation Wedges 2-5
Submission Identification

Submitted to: Pentagon Renovation Office
Prepared by: Author Firm of the Document
Submitted by: Typically, Shalom Baranes Associates, PC
For: Typically, Hensel Phelps Construction Co.
Date of Submission

Every Report Cover is to include the phrase “For Official Use Only” at the bottom of the Cover page.

3.2.2 Specifications Covers and Report Flysheets

Covers for submissions of Specifications do not contain a graphic image. The following format is to be followed for Specifications Covers and will also be used as the Flysheet following a Report Cover:

Font

Font: Times Roman
Color: Black
Size: 12 pts

Margins

Top: 1”
Bottom 1”
Left: 1”
Right: 1”

Field	Font Size
Document title	18 bold
Project name	18 bold
Project address	18 bold
Submission or revision indicator	18 bold
Submission date	18 bold
Volume number (ex: 1 of 2)	18 bold
Client name (Prepared for:)	16
Client address	16
Client point of contact	14
Client point of contact phone number	14
Contract number	14
Delivery order number	14
Modification number	14
Author name (Prepared by:)	14
Author address	14
Author point of contact	14
Author point of contact phone number	14

The field, “Client” will be preceded by the phrase “Prepared for:” and will include the client’s complete organizational name and its address.

The field “Contract number” will be preceded by the phrase “Contract No.”

The field “Delivery order number” will be preceded by the phrase “Delivery Order No.”

The field “Modification number” will be preceded by the phrase “Modification No.”

The field, “Author” will be preceded by the phrase “Prepared by:” and will include the full corporate name and address of the authoring organization.

The field “Volume” will be in the format “Volume # of #”.

3.3 Documents - Text Based

3.3.1 Presentation Guidelines

Documents shall be created and printed in Microsoft Word 2000 as single-sided or double-sided pages as appropriate per the following guidelines:

- Specifications shall be doubled-sided.
- Master Plan Basis of Design Narratives and typical reports shall be single-sided.

3.3.1.1 Report Format

Appropriate steps shall be taken to adjust for bound documents. Specifications for most of the common page setup settings to be used for the preparation of Reports are given below:

Font: Times New Roman

Black

Document Margins:

Top: 1.0”

Bottom: 1.0”

Left: 1.0”

Right:	1.0”
Header:	0.5”
Footer:	0.5”

Headers:

Font:	14pt Bold
	Effects: Small Caps
Section No. and Name:	Align with left margin
Line:	Add a Horizontal Line at bottom of Header to separate it from the Report Text.

Footers:

Font:	11pt Bold
	Effects: Small Caps
Top Line:	Project Name aligned with left margin
	Deliverable Date aligned with right margin
Bottom Line:	Study name aligned with left margin
	Single numeral page number aligned with right margin
Line:	Add a Horizontal Line at top of Footer to separate it from the Report Text.

Body of Report:

Font:	12pt Regular
Sections:	New sections shall be divided by Section Breaks with identification of the new section in the Header.

Paragraphs:	Single space typically; double space after major headings
Indent Spacing:	Typically 0.5”
Paragraph Numbering General:	All paragraph numbering levels are to be 12pt Regular with the exception of the initial level “A, B, C,” etc. which may be 12pt Bold Italic.
Paragraph Numbering Format:	***A. Text*** Letter aligned on left margin; text indented 0.5” 1. Text Number at 0.5”; text indented at 1.0” a. Text Number at 1.0”; text indented at 1.5” 1) Text Number at 1.5”; text indented at 2.0” a) Text Number at 2.0”; text indented at 2.5” i. Text Number at 2.5”; text indented at 3.0”

3.3.1.1.1 Tables of Contents for Reports

Tables of Contents for Reports are to be produced per template provided by the A/E. Format is described briefly as follows:

Headers

- Delete typical Report Header from Table of Contents.
- In lieu of typical Report Header, add two lines at Top Center of Table of Contents as follows:

- Top Line: Title of Study
  - Font: 14pt Bold, Small Caps Effects
- Second Line: Table of Contents
  - Font: 14pt Regular, Small Caps Effects

Footers

- Footers are identical to typical Report Footer with the following exception:
  - Footer Bottom Line: Single numeral page number is to be in lower case Roman Numerals for Table of Contents only, beginning with "i".

Body of Table of Contents

- Section No. and Name:
  - Align with left Margin
  - Font: 12pt Bold
  - Dot leader to Flush Right Page Number follows each Section Name

Hyper-linking

All text documents containing a table of contents (TOC) shall be indexed and hyperlinked to the first page of each section listed in the TOC Adobe's indexing function. Compound text documents not including actual embedded CADD graphics shall contain a hyperlink that will launch a freeware document viewer and display the image.

3.3.1.2 Specifications Format

Specifications shall be prepared using CSI Master Format. Specific Header and Footer information shall be dictated by the A/E prior to a submission.

3.3.2 Electronic Formats

3.3.2.1 Source Format

3.3.2.1.1 Microsoft Word 2000

All deliverables should be delivered on CD-ROM in DOS/NT format. The documents should be prepared in Microsoft Word 2000.

3.3.2.2 View and Print Format

3.3.2.2.1 Adobe Acrobat 4.0

All text documents shall be delivered in PDF format. Documents containing a table of contents (TOC) shall be indexed and hyperlinked to the first page of each section. Compound text

documents not including actual embedded CADD graphics shall contain a hyperlink that will launch the viewer and display the image.

3.3.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

3.4 Documents - Spreadsheet

3.4.1 Presentation Guidelines

Documents shall be created and printed in Microsoft Excel 2000 as single-sided or double-sided pages as appropriate for the specific spreadsheet.

3.4.2 Electronic Formats

3.4.2.1.1 Microsoft Word 2000

All deliverables should be delivered on CD-ROM in DOS/NT format. The documents should be prepared in Microsoft Word 6.0 or a later version.

3.4.2.2 Source Format

3.4.2.2.1 Microsoft Excel 2000

All deliverables should be delivered on CD-ROM in DOS/NT format or on CD-ROM. The documents should be prepared in Microsoft Excel 2000 or a later version.

3.4.2.3 View and Print Format

3.4.2.3.1 Adobe Acrobat 4.0

All spreadsheets shall be delivered in PDF format. Documents containing a table of contents (TOC) shall be indexed and hyperlinked to the first page of each section. Compound text documents not including actual embedded CADD graphics shall contain a hyperlink that will launch the viewer and display the image.

3.4.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

3.5 Documents - Vector Graphics

3.5.1 Presentation Guidelines

3.5.2 Electronic Formats

3.5.2.1 Source Format

3.5.2.1.1 MicroStation Triforma V8

All deliverables should be delivered on CD-ROM in DOS/NT format or on CD-ROM. The documents should be prepared in Bentley Systems MicroStation Triforma V8

3.5.2.2 Web Viewing Format

3.5.2.2.1 Web Plugin for *.wrl, svf, cals, tiff, jpeg

3.5.2.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

3.6 Documents – Raster Graphics

3.6.1 Presentation Guidelines

3.6.2 Electronic Formats

3.6.2.1 Source Format

3.6.2.1.1 JPEG

All deliverables should be delivered on CD-ROM in DOS/NT format. The documents should be prepared in JPEG (or JPG) format.

3.6.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

3.7 Documents - Presentation

3.7.1 Presentation Guidelines

3.7.2 Electronic Formats

3.7.2.1 Source Format

3.7.2.1.1 Microsoft PowerPoint 2000

All deliverables should be delivered on CD-ROM in DOS/NT format. The documents should be prepared in Microsoft PowerPoint 2000 or a later version.

3.7.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

3.8 Reports – Project Management

Throughout the Pentagon Wedges 2-5 Renovation Project there will be a consistent requirement for clear and concise communications between the Contractor and the PenRen Team. The effort to provide the timely, accurate and consistent electronic data in the most cost efficient manner will require the submission of various reports on a regularly scheduled basis. The format of the report will be dependent on the time sensitive nature of the material being presented.

The list of project management reports/tools includes, but is not limited to:

- Submittal Register
- RFI Register
- IPS/CPM
  - Milestone Schedule
  - 90 Day Look Ahead Schedule
- IPP
- Monthly Report
- Monthly Briefing

Each of these reports requires a different level of detail as well as requirements for current data.

3.8.1 Presentation Guidelines

All documents shall be created in a method for the most effective and efficient transmission of the material.

- Submittal and RFI Registers are kept current and available for review on ProjectTalk,
- Primavera (P3) CPM schedule reviews are presented in several formats including network accessibility, 3 ½ diskette and hard copies as required for planning purposes
- Monthly report is transmitted as a bound report with a copy posted on an extranet-shared drive for review throughout the month.
- Monthly Briefing is presented at a scheduled meeting and is supplemented with information on Microsoft PowerPoint 4.0 slides.

The reports should follow presentation guidelines established for the specific documents. For example: Documents – Text Based, Spreadsheet, Schedule, etc.

3.8.1.1 Schedule Presentation Guidelines

Naming System – four-digit alphanumeric identification

DIGIT POSITION	ALPHA/NUMERIC	REPRESENTATION
1st digit	Alpha	Month
2nd digit	Numeric	Year
3rd digit	Numeric	Update Schedule
4th digit	Alpha	Latest version for that month
4th digit	Numeric	Latest version of "What If" or TIA Schedule

For example: "K01C" representing the third schedule version developed with a status date of November 2001.

A second example: "B011" representing the first "What-If" or "Time Impact Analysis" (TIA) that was developed in February 2001.

Activity ID Reference System

P3 allows for the use of 10 digit alphanumeric identification of specific activities. All activity identifications will start with the appropriate Project ID from the activity codes for the first two (2) characters. This will allow the creation of sub-projects in the schedule files that will make it easier to integrate the OGC's schedules. The third (3rd) character in the activity ID will vary according to the Project type coding field of the standard project integrated activity codes. The remaining seven (7) fields will be random and unique numbers to be used as a key field to maintain integrity within the P3 database.

3.8.2 Electronic Formats

3.8.2.1 Source Formats

- ProjectTalk – internet accessibility and collaboration – Submittal & RFI Registers, Meeting Schedules, etc.

A hard copy of this information can be printed from individual PC and/or a hard copy will be included with the Monthly Report.

- Primavera (P3) – CPM Schedule

  All deliverables should be delivered on a 3 ½ inch diskette or on CD in DOS/NT format.

- Extranet – Shared drives – posted copy of monthly report

- Microsoft PowerPoint 4.0 – monthly report.

3.8.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

3.9 Documents - Compound

3.9.1 Presentation Guidelines

3.9.2 Electronic Formats

Compound documents (documents containing both text and additional document types e.g. spreadsheets, project charts) may be produced using an inclusion format such as OLE objects, or the document may be converted to Microsoft Word 2000 format.

3.9.2.1 Source Format

3.9.2.1.1 Microsoft Word 2000

All deliverables should be delivered on CD-ROM in DOS/NT format. The documents should be prepared in Microsoft Word 2000.

3.9.2.2 View and Print Format

3.9.2.2.1 Adobe Acrobat

All deliverables should be prepared in Adobe Acrobat 4.0. They should be organized with a page description format (PDF).

3.9.3 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

4 CPM Construction Schedule Standards

4.1 Presentation Guidelines

HPCC has developed a series of specialized Primavera Layouts. Essentially, each Primavera Layout is a different way of filtering and organizing the information contained in the schedule database. The goal is to present the schedule information in a clear, logical, and easily understandable format. Some examples of the Primavera Layouts we use are: (please see Primavera Layouts that follow)

- Subcontractor – See activities relevant to a single contractor.
- 4-Week Look Ahead – See only activities schedule to take place within the next four weeks.
- Update – See only activities that are likely to have progressed since the previous update.
- Billing – See only activities relevant to the current billing.
- Total Float – See activities arranged by float values then by early start.
- Critical Path – See activities that are currently on the Critical Path.

This list is just a sampling of the types of specialized layouts we can generate. We also have the capacity to print these same layouts in large formats up to 36" x 48".

Many of these layouts are filtered and organized based on "Codes" that we can assign to each schedule activity. Please see the attached Code Dictionary that lists and describes the codes we are currently using in our schedule.

4.1.1 Electronic Formats

4.1.1.1 Source Format

All schedules electronically transmitted to the Pentagon Renovation Organization will be in the Primavera Project Planner 3.0 (or better) format.

4.1.2 Catalog

All of the diskettes or CD's should be accompanied by a catalog listing of the documents included on the diskette or CD.

5 Appendix A – Discipline Designators and Discipline Modifiers

5.1

Common Discipline Modifiers

D:	Demolition
E:	Elevations
F:	Plans
G:	Discipline Specific Cover sheet, Index of drawings, General Notes, Legends & Symbols and other General information
Q:	Equipment Plans
S:	Diagrams
T:	Details
V:	Vertical Transportation
W:	Tenant Details
X:	Sections
Y:	Schedules

5.2

Discipline Designators and Discipline Modifiers

Discipline Designators	Discipline Modifiers
G – General	
	A: General Area Calculations
	B: General Border File
	C: General Cover Sheet
	F: General Fire and Exit Plan
	G: General Study
	H: General Historic Area Plan
	I: General Information
	K: General Key Plan
	N: General Notes
	R: General Contractual
	S: General Symbols, Tags
A – Architectural	***SHALOM BARANES ASSOCIATES*** ***HDR ARCHITECTURE INC.***
	B: Architectural Raised Floor Plan
	C: Architectural Reflected Ceiling
	D: Architectural Demolition
	F: Architectural Floor Plan
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend & Symbols and other General Information)

Discipline Designators	Discipline Modifiers
	H: Architectural Hardscape
	I: Architectural Interior Elevation
	K: Architectural Partition Type Sheet
	L: Architectural Enlarged Plan
	N: Architectural Door & Window Details
	P: Architectural Pattern Layout
	R: Architectural Roof Plan
	S: Architectural Diagrams
	T: Architectural Details
	U: Architectural Toilet Layout
	V: Architectural Vertical Circulation Layout
	W: Architectural Tenant Details
	X: Architectural Building Sections
C – Civil	***WILES MENSCH CORPORATION***
	F: Site Plan Layout
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
E – Electrical	***M.C. DEAN***
	A: Electrical Power Auxiliary
	D: Electrical Power Demolition Plan
	F: Electrical Power Plan
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)

Discipline Designators	Discipline Modifiers
	H: Electrical Security Plan
	L: Electrical Lighting Plan
	M: Electrical Power Grounding System
	O: Electrical Power One-Line Diagrams
	P: Electrical IM&T PDS Conduit Plan
	R: Electrical Power Riser Diagrams
	T: Electrical Details
	U: Electrical IM&T Plans
	W: Electrical Tenant Details
	Y: Electrical Schedules
F – Food Service	***CULINARY ADVISORS***
	F: Plan Layout
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
H – Mechanical - HVAC	***SOUTHLAND INDUSTRIES***
	C: Mechanical-HVAC Controls
	D: Mechanical-HVAC Demolition
	E: Mechanical-HVAC Elevations
	F: Mechanical-HVAC Floor Plans
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
	L: Mechanical-HVAC Enlarged Plans
	Q: Mechanical-HVAC Equipment

Discipline Designators	Discipline Modifiers
	R: Mechanical-HVAC Roof
	S: Mechanical-HVAC Schematic Diagrams
	T: Mechanical-HVAC Details
	W: Mechanical Tenant Details
	X: Mechanical-HVAC Sections
	Y: Mechanical-HVAC Schedules
K – Mechanical Piping	***SOUTHLAND INDUSTRIES***
	D: Mechanical- Piping Demolition
	E: Mechanical- Piping & Equip Elevation
	F: Mechanical- Piping Floor Plans
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
	L: Mechanical- Piping Enlarged Plans
	Q: Mechanical- Piping Equipment
	S: Mechanical- Piping Schematic Diagrams
	T: Mechanical- Piping Details
	X: Mechanical- Piping Sections
	Y: Mechanical- Piping Schedules
M – Signage	***SHALOM BARANES ASSOCIATES*** ***HDR ARCHITECTURE INC.***
	F: Plan Layout
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)

Discipline Designators	Discipline Modifiers
P - Plumbing	***SOUTHLAND INDUSTRIES***
	D: Plumbing Demolition
	E: Plumbing Elevation
	F: Plumbing Floor Plans
	F: Plumbing Enlarged Plans
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
	R: Plumbing Riser Diagrams
	S: Plumbing Schematic Diagrams
	T: Plumbing Details
	Y: Plumbing Schedules
Q – Exhibit Casework	
	F: Plan Layout
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
S - Structural	***TADJER COHEN EDELSON ASSOCIATES, INC.***
	F: Structural Floor Plans
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
	R: Structural Roof Plans
	T: Structural Miscellaneous Details
	W: Structural Tenant Details
	X: Structural Sections

Discipline Designators	Discipline Modifiers
Y – Fire Protection	***SCHIRMER ENGINEERING***
	D: Fire Protection Demolition Plan
	F: Fire protection Plan
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
	T: Fire Protection Details
Z – Electrical Fire Alarm	***M.C. DEAN***
	F: Electrical Fire Alarm Plan
	G: Discipline specific General Drawings (Cover sheet, Index of drawings, Notes, Legend and Symbols and other General Information)
	R: Electrical Fire Alarm Riser
	Y: Electrical Fire Alarm Schedule

Appendix B - CADD Level Assignments and Descriptions

Level Type	Level Name	Level Description	Line Style	Color
B.1. GENERAL LEVELS ON SHEET FILE FOR ALL DISCIPLINES				
B.1.a General levels for the Title Sheet Border reference file and the Cover sheet				
	G-SHBD-0002	Drawing Sheet Border, Title Blocks, Project-specific Title Text – 0.007 inch line work.	0	2
	G-SHBD-0003	Drawing Sheet Border, Title Blocks, Project-specific Title Text – 0.010 inch line work.	0	3
	G-SHBD-0004	Drawing Sheet Border, Title Blocks, Project-specific Title Text – 0.013 inch line work.	0	4

	G-SHBD-0005 G-SHBD-0006	Drawing Sheet Border, Title Blocks, Project-specific Title Text – 0.020 inch line work.	0	5,6
	G-SHBD-0007	Drawing Sheet Border, Title Blocks, Project-specific Title Text – 0.023 inch line work.	0	7
	G-SHBD-0009	Drawing Sheet Border, Title Blocks, Project-specific Title Text – 0.003 inch line work.	0	9
This level and shape will be used by the pen table to determine the extent of plot	G-SHBD-OTLN	Sheet Border inked area outline. Pen table to use this level and shape for plotting area.	0	13
B.1.b General levels for KEY PLAN on the Title Sheet Border				
	G- KEYP-SEC1	Key plan shaded area AB1	0	9
	G- KEYP-SEC2	Key plan shaded area AB2	0	9
	G- KEYP-SEC3	Key plan shaded area AB3	0	9
	G- KEYP-SEC4	Key plan shaded area AB4	0	9
	G- KEYP-SEC5	Key plan shaded area CDE5	0	9
	G- KEYP-SEC6	Key plan shaded area CDE6	0	9
	G- KEYP-SEC7	Key plan shaded area CDE7	0	9
	G- KEYP-SEC8	Key plan shaded area CDE8	0	9
	G- KEYP-SEC9	Key plan shaded area CDE9	0	9
	G- KEYP-0002	0.007 inch Line work	0	2
	G- KEYP-0004	0.013 inch Line work	0	4
	G- KEYP-0005	0.020 inch Line work	0	5
	G- KEYP-0009	0.003 inch Line work	0	9
	G- KEYP-0010	0.017 inch Line work	0	10
B.1.c General Levels for the model named 'PLOT' on sheet files for plotting				
	G-ANNO-DIMS	Dimensions in drawing area	0	3
	G-ANNO-DIMS-COLS	Dimensions in column grid	0	3
	G-ANNO-INFO	Sheet no., Plate no., Date, Drawing title, Revision description in the border area	0	4

	G-ANNO-NPLT	Non plot elements, clip boundary	0	9
Insert as a single cell for all floors	G-ANNO-PHAS	Phase line in the default model of sheet file	4	10
	G-ANNO-SYMB	Symbols in drawing area	0	4
	G-ANNO-TEXT	Text, Text with leader in drawing area	0	4
	G-REVS-BUBL-0001	Cloud symbol for revision number 1 in drawing area	0	4
	G-REVS-NUMB-0001	Triangle symbol for revision number 1 in drawing area and border area	0	4

Level Type	Level Name	Level Description	Line Style	Color
B.2. LEVELS ON DESIGN MODEL AND REFERENCE FILES BY EACH DISCIPLINE				
B.2.1 ARCHITECTURE (A), (B)				
B.2.1.a Floor				
	A-FLOR-ACCS	Toilet accessories	0	1
	A-FLOR-DEMO	Floor slab/area demolition, including equipment, floor drain and toilet partitions	2	3
	A-FLOR-DRAN	New floor drain	0	2
	A-FLOR-EQPM	New floor equipment	0	1
	A-FLOR-EQPM-FIRE	New fire protection cabinets, equipments and valves	0	3
	A-FLOR-EQPM-TELE	New Telephone equipments	0	3
	A-FLOR-EXPJ	Floor expansion joint lines	0	2
	A-FLOR-EXST	Existing floor to remain	0	15
	A-FLOR-FIXT	Plumbing fixtures, Toilet fixtures	0	2
	A-FLOR-HRAL	Handrails/Guardrail for ramps, steps, short stairs or level changes	0	1
	A-FLOR-HTCH	Hatched/Solid shaded areas	0	14
	A-FLOR-HTCH-DEMO	Floor demolition area hatch	0	15
	A-FLOR-LEVL	Level change or drops including steps/short stairs within the same floor, Pits, Breaks in construction, Depressions, Slopes, Ramps	0	2

Level Type	Level Name	Level Description	Line Style	Color
	A-FLOR-LMIT	Limit of construction line	1	19
Insert on base plan files as a single cell	A-FLOR-MTCH	Match Line in base plan files	6	18
	A-FLOR-NICN	Not In Contract items	2	9
	A-FLOR-OPEN	New floor and shaft openings, Elevator pit openings (including outline and cross lines)	0	2
	A-FLOR-OPEN-DEMO	Demolition floor and shaft openings, Elevator pit openings (including outline and cross lines)	2	2
	A-FLOR-OPEN-EXST	Existing floor and shaft openings, Elevator pit openings (including outline and cross lines)	0	15
	A-FLOR-OVHD	Access panels, Ceiling penetrations, Ceiling level changes, Overhead skylights, Overhangs, All hidden elements	2	9
	A-FLOR-PATT-0009	Material design patterns (e.g. paving, tile, carpet)	0	9
	A-FLOR-RAIS	Access (Raised) flooring	0	2
	A-FLOR-TPTN	Toilet partition, Toilet partition doors, Door swing	0	2
B.2.1.d Walls (Exterior, Interior, Furring, Column enclosure)				
	A-WALL-EXTR	New exterior full height wall	0	6
	A-WALL-EXTR-DEMO	Demolition exterior full height wall	2	6
	A-WALL-EXTR-EXST	Existing exterior full height wall to Remain	0	15
	A-WALL-EXTR-PRHT	New exterior partial height wall	0	4
	A-WALL-HEAD	Interior or exterior door, window and wall opening head	0	3
	A-WALL-HEAD-EXST	Existing interior or exterior door, window and wall opening head	0	15
	A-WALL-HTCH	Hatch/Solid shaded areas	0	14

Level Type	Level Name	Level Description	Line Style	Color
	A-WALL-INTR	New interior full height wall	0	6
	A-WALL-INTR-DEMO	Demolition interior wall	2	6
	A-WALL-INTR-EXST	Existing interior full height wall to remain	0	15
	A-WALL-INTR-PRHT	New interior partial height wall	0	4
B.2.1.e Doors				
	A-DOOR	New door, Frame & swing line	0	3
	A-DOOR-DEMO	Demolition door, Frame & swing line	2	3
	A-DOOR-EXST	Existing door, Frame & swing line	0	15
	A-DOOR-HIST-EXST	Existing Historic door, frame & swing line	0	2
	A-DOOR-SILL	New threshold at door or door opening	0	9
B.2.1.f Windows				
	A-GLAZ	New windows, Window walls, Curtain walls, Glazed partitions and Frame	0	3
	A-GLAZ-DEMO	Demolition window and frame	2	3
	A-GLAZ-EXST	Existing window and frame	0	15
	A-GLAZ-SILL	New window sill	0	4
	A-GLAZ-SILL-EXST	Existing window sill	0	15
B.2.1.g Louvers				
	A-LUVR	New louver and frame	0	3
	A-LUVR-DEMO	Demolition louver and frame	2	3
	A-LUVR-EXST	Existing louver and frame	0	15
	A-LUVR-SILL	New louver sill	0	4
B.2.1.j Escalators/ Moving walks				
	A-ESCL	New escalators, Moving sidewalks	0	3
	A-ESCL-DEMO	Demolition escalators, Moving walks	2	3
	A-ESCL-EXST	Existing escalators, Moving walks	0	15
B.2.1.i Elevators				
	A-EVTR	New elevators, Dumbwaiters	0	3
	A-EVTR-DEMO	Demolition elevators, Dumbwaiters	2	3
	A-EVTR-EXST	Existing elevators, Dumbwaiters	0	15
B.2.1.k Plumbing				

Level Type	Level Name	Level Description	Line Style	Color
	A-PIPE	New piping and risers	0	3
	A-PIPE-DEMO	Demolition piping and risers	2	3
	A-PIPE-EXST	Existing piping and risers	0	15
B.2.1.h Stairs				
	A-STRS	New stairs, ladders	0	3
	A-STRS-DEMO	Demolition stairs	2	3
	A-STRS-EXST	Existing stairs	0	15
	A-STRS-HRAL	New handrail/guardrail	0	1
	A-STRS-HRAL-DEMO	Demolition handrail/guardrail	2	2
	A-STRS-HRAL-EXST	Existing handrail/guardrail	0	15
	A-STRS-INFO	Stair cut line, Stair direction leader with text (ht = 9" and width = 7 13/64" to show on 1/8" scale sheet files)	0	1
B.2.1.n Woodwork				
	A-FLOR-CASE	New cabinets and counters	0	2
	A-FLOR-MLWK	New millwork	0	2
	A-FLOR-WDWK	New woodwork	0	2
B.2.1.c Reflected Ceiling				
	A-CLNG-ACCS	Access panels, Ceiling penetrations	0	4
	A-CLNG-DEMO	Demolition ceiling and all related items	2	3
	A-CLNG-EQPM	Ceiling equipment	0	4
	A-CLNG-EXIT	Ceiling exit lights	0	3
	A-CLNG-EXPJ	Ceiling expansion joint lines	0	2
	A-CLNG-GRID	Ceiling tile grid	0	2
	A-CLNG-GYPB	Gypsum bd. ceiling, Ceiling bulkheads	0	3
	A-CLNG-GYPB-EXST	Existing Gyp Bd Ceiling	0	15
	A-CLNG-HIDN	Hidden items above ceiling	2	3
	A-CLNG-HTCH	Hatch/Solid shaded areas	0	14
	A-CLNG-HTCH-DEMO	Hatch/Solid shaded areas	0	15
	A-CLNG-HVAC	Ceiling HVAC equipment	0	10
	A-CLNG-LEVL	Ceiling level change	0	5
	A-CLNG-LITE	Lights	0	4
	A-CLNG-LITE-HIDN	Hidden cove lights	2	3
	A-CLNG-PATT	Ceiling design pattern	0	2
	A-CLNG-SMOK	Ceiling smoke detectors	0	3
	A-CLNG-SPRK	Ceiling sprinkler heads	0	4
	A-CLNG-SPKR	Ceiling speakers	0	4
B.2.1.b Roof				

Level Type	Level Name	Level Description	Line Style	Color
	A-ROOF DRAN	Roof drain, Scupper	0	2
	A-ROOF-ACCS	Roof access doors	0	3
	A-ROOF-DEMO	Demolition Roof	0	6
	A-ROOF-EQPM	Roof equipments, Lights, Camera, Window washing equipment	0	2
	A-ROOF-HTCH	Hatch/solid shaded areas	0	14
	A-ROOF-HTCH-DEMO	Demolition hatch/solid shaded areas	0	15
	A-ROOF-NICN	Not In Contract items	2	9
	A-ROOF-OPEN	Roof openings	0	4
	A-ROOF-OTLN	Roof perimeter, Roof edge, Roof geometry, Parapet	0	6
	A-ROOF-OTLN-EXST	Existing Roof perimeter, Roof edge, Roof geometry, Parapet	0	15
	A-ROOF-PATT	Roof surface patterns	0	2
	A-ROOF-SLOP	Roof slope lines	0	3
B.2.1.m Area Information				
	A-AREA-HTCH-0009 A-AREA-HTCH-0013 A-AREA-HTCH-0014 A-AREA-HTCH-0015	New hatch/solid shaded areas	0	9,13,14, 15
	A-AREA-HTCH-DEMO	Demolition hatch/solid shaded areas	0	15
	A-AREA-OTLN	New Architectural area calculation boundary outline	0	2
	A-AREA-OTLN-DEMO	Demolition Architectural area calculation boundary outline	2	2
	A-AREA-01HR	Line style indicating 1 hr rated wall/partition	3	13
	A-AREA- 02HR	Line style indicating 2 hr rated wall/partition	4	14
	A-AREA- 03HR	Line style indicating 3 hr rated wall/partition	5	15
	A-AREA-FIRE-02HR	Line style indicating 2HR Fire Separation wall	6	13
	A-AREA-SMOK	Line style indicating Smoke Partitions	7	14
	A-AREA-RNAM	Room name	0	4
	A-AREA-RNUM	Room number	0	4
	A-AREA-INFO	Area calculation information text	0	4
B.2.1.l Columns				

Level Type	Level Name	Level Description	Line Style	Color
	A-COLS-FLR1	New structural columns at first floor	0	6
	A-COLS-FLR2	New structural columns at second floor	0	6
	A-COLS-FLR3	New structural columns at third floor	0	6
	A-COLS-FLR4	New structural columns at fourth floor	0	6
	A-COLS-FLR5	New structural columns at fifth floor	0	6
	A-COLS-ROOF	New structural columns at roof	0	6
	A-COLS-BSMT	New structural columns at basement	0	6
	A-COLS-MEZZ	New structural columns at mezzanine	0	6
	A-COLS-DEMO	Demolition structural columns	2	6
	A-COLS-FLR1-EXST	Existing structural columns at first floor	0	15
	A-COLS-FLR2-EXST	Existing structural columns at second floor	0	15
	A-COLS-FLR3-EXST	Existing structural columns at third floor	0	15
	A-COLS-FLR4-EXST	Existing structural columns at fourth floor	0	15
	A-COLS-FLR5-EXST	Existing structural columns at fifth floor	0	15
	A-COLS-ROOF-EXST	Existing structural columns at roof	0	15
	A-COLS-BSMT-EXST	Existing structural columns at basement	0	15
	A-COLS-MEZZ-EXST	Existing structural columns at mezzanine	0	15
Base reference file and Sheet file	A-COLS-GRID	Structural column grid	7	9
	A-PCAP-BSMT-EXST	Existing structural pile caps at basement	5	15
	A-PCAP-MEZZ-EXST	Existing structural pile caps at mezzanine	5	15
B.2.1.o Furniture				
	A-FURN-WKSF	Furnishings: System Work Surface Components	0	4

Level Type	Level Name	Level Description	Line Style	Color
	A-FURN-PNLS	Furnishings: System Panels	0	4
	A-FURN-STOR	Furnishings: System Storage Components	0	4
	A-FURN-EXST	Furnishings: Existing	0	4
	A-FURN-FREE	Furnishings: Freestanding	0	4
B.2.1.p Elevation/ Section/ Detail				
	A-LINE-GRID	Column Grid lines, Center lines	7	9
	A-LINE-HTCH-0009 A-LINE-HTCH-0013 A-LINE-HTCH-0014 A-LINE-HTCH-0015	Hatch/solid shaded areas	0	9,13,14, 15
	A-LINE-NPLT	Construction lines, Area calculations	0	9
	A-LINE-PATT	Patterning	0	9
	A-LINE-0001 A-LINE-0008 A-LINE-0009	0.003 inch detail line work	0,Varies	1,8,9
Colors 13,14 & 15 are screened (see color = pen weight table)	A-LINE-0002 A-LINE-0013 A-LINE-0014 A-LINE-0015	0.007 inch detail line work	0,Varies	2,13,14, 15
	A-LINE-0003 A-LINE-0011 A-LINE-0012	0.010 inch detail line work	0,Varies	3,11,12
	A-LINE-0004	0.013 inch detail line work	0,Varies	4
	A-LINE-0010	0.017 inch detail line work	0,Varies	10
	A-LINE-0005 A-LINE-0006	0.020 inch detail line work	0,Varies	5,6
	A-LINE-0007	0.023 inch detail line work	0,Varies	7
	A-LINE-0016	0.030 inch detail line work	0,Varies	16
	A-LINE-0017	0.040 inch detail line work	0,Varies	17
	A-LINE-0018	0.050 inch detail line work	0,Varies	18
B.2.2 Civil – (C)				
Building and Primary Structures				
	C-BLDG-IDEN	Annotation	0	4
	C-BLDG-OTLN	Building and primary structures - outline	0	7
Property				

Level Type	Level Name	Level Description	Line Style	Color
	C-PROP-CONS	Construction limits with annotation	7	0
	C-PROP-ESMT	Easements with annotation	6	0
	C-PROP-RWAY	Right of ways with annotation	6	0
Storm Drainage System				
	C-STRM-CULV	Culverts, headwalls, drainage inlets, storm drains	0	7
	C-STRM-DTCH	Ditches with annotation	0	4
	C-STRM-EROS	Erosion control	0	7
	C-STRM-IDEN	Culverts, headwalls, drainage inlets - annotation	0	4
	C-STRM-POND	Ponds with annotation	0	5
Topography				
	C-TOPO-BORE	Soil boring layout	0	4
	C-TOPO-MAID	Major contours - annotation	0	7
	C-TOPO-MAJR	Major contours	0	7
	C-TOPO-MIID	Minor contours - annotation	0	4
	C-TOPO-MINR	Minor contour	0	4
	C-TOPO-SPOT	Spot elevations	0	7
	C-TOPO-SLID	Cut/fill slopes - annotation	0	4
	C-TOPO-SLOP	Cut/fill slopes	0	4
	C-TOPO-XSPR	Profiles and x-sections, grid borders, grid lines, coordinate grid with annotation	0	4
Domestic Water System and Common Use Fire Protection				
	C-WATR-IDEN	Annotation	0	4
	C-WATR-UNDR	Domestic water - underground lines (lines, valves, wells, storage tanks)	5	4
Dedicated Fire Protection System				
	C-FIRE-IDEN	Annotation	0	4
	C-FIRE-UNDR	Dedicated fire protection - underground lines (lines, hydrants, storage tanks)	4	4
Natural Gas System				
	C-NGAS-IDEN	Annotation	0	4
	C-NGAS-UNDR	Natural gas - underground lines (lines, valves, meters)	6	4
Sanitary Sewer System				
	C-SSWR-IDEN	Annotation	0	4

Level Type	Level Name	Level Description	Line Style	Color
	C-SSWR-UNDR	Sanitary sewer - underground lines (lines, manholes, pumping stations)	3	4
Steam System				
	C-STEM-IDEN	Annotation	0	4
	C-STEM-UNDR	Steam system - underground lines (lines, valves, manholes)	7	4
Fuel System				
	C-FUEL-PIPE	Fuel piping	0	4
	C-FUEL-TANK	Fuel tanks	2	4
Demolition				
	C-DEMO-HAZW	Hazardous waste	0	5
	C-DEMO-REMV	Existing to be removed	2	3
	C-DEMO-STAY	Existing to remain	0	5
Site				
	C-SITE-FENC	Fences	0	5
	C-SITE-IDEN	Annotation	0	5
	C-SITE-IMPR	Site improvements	0	5
	C-SITE-SIGN	Signs	0	7
	C-SITE-WALK	Walks and trails	0	5
B.2.3 Electrical (E)				
Lighting				
	E-LITE-SYMB	sheet specific symbols	0	7
	E-LITE-EQPM	physical outline of elec. Equip	0	5
	E-LITE-JBOX	junction boxes	0	6
	E-LITE-SWCH	switches - symbols	0	6
	E-LITE-CLNG	ceiling mounted fixtures	0	7
	E-LITE-EMER	emergency fixtures	0	7
	E-LITE-EXIT	exit fixtures	0	7
	E-LITE-FLOR	floor mounted fixtures	0	7
	E-LITE-IDEN	light fixture identifier tags	0	4
	E-LITE-SPCL	special fixtures	0	5
	E-LITE-WALL	wall mounted fixtures	0	7
	E-LITE-CTCW	concealed wiring and conduit	2	7
	E-LITE-CTID	circuit identifiers on homeruns	0	4
	E-LITE-CTRL	controls (ex. Thermostat)	0	7
	E-LITE-CTXW	exposed wiring and conduit	0	7
	E-LITE-CTHR		0	7
	E-PATT		0	4

Level Type	Level Name	Level Description	Line Style	Color
	E-NPLT		0	0
Grounding				
	E-GRND-EXPD	exposed ground system diagram	0	7
	E-GRND-CNLD	concealed ground system diagram	2	7
	E-POWR-EQPM	physical outline of electrical equip	0	6
	E-POWR-TRAY	busways-cable trays-wireways	0	5
Power				
	E-POWR-SYMB	sheet specific symbols	0	10
	E-POWR-EQID	identifiers and leader lines	0	4
	E-POWR-EQPM	physical outline of elec. Equip	0	7
	E-POWR-JBOX	junction boxes	0	6
	E-POWR-SWCH	switches, starters, switch symbols	0	6
	E-POWR-RCPT	power recepts, outlets, assoc. text	0	7
	E-POWR-TRAY	busways, cable trays, wireways, etc.	0	7
	E-POWR-MOTR	motors and utilization equip symbols	0	6
	E-POWR-CTCW	concealed wiring and conduit	2	5
	E-POWR-CTID	circuit identifiers, conduit sizes	0	4
	E-POWR-CTRL	controls	2	6
	E-POWR-CTXW	exposed wiring and conduit	0	6
	E-POWR-CIRC	circuits	0	7
	E-GRND-DIAG	ground system diagram	0	7
	E-GRND-EQPM	equipment ground system	0	6
	E-GRND-REFR	reference ground system	0	5
	E-LINE-0003	light one line work	0	3
	E-LINE-0010	medium one line work	0	10
	E-LINE-0007	heavy one line work	0	7
	E-RISR-0003	light riser line work	0	3
	E-RISR-0010	medium riser line work	0	10
	E-RISR-0007	heavy riser line work	0	7
	E-POWR-NPLT	NO PLOT	0	0

Level Type	Level Name	Level Description	Line Style	Color
Security				
	E-ACCC-EXTR	ext. mtd. Access control	0	5
	E-ACCC-PANL	access control unit/panel	0	5
	E-ACCC-WALL	access control devices	0	5
	E-ANCN-PANL	annunc equip. ctrl unit panel	0	5
	E-ANCN-RESN	remote station	0	5
	E-BARR-FENC	fences/gates	0	5
	E-BARR-SENS	sensors	0	6
	E-BARR-WALL	walls	0	5
	E-COMM-CLNG	equipment	0	5
	E-COMM-INTC	intercoms/speakers	0	6
	E-COMM-PANL	communication panel	0	5
	E-COMM-WALL	wall comm. md.	0	5
	E-SWCH-FLSH	flush mtd switches/contacts	0	6
	E-SWCH-SURF	surface switches/contacts mtd	0	6
	E-SENS-BURD	buried sensor	0	6
	E-SENS-CLNG	ceiling mounted sensor	0	6
	E-SENS-FLOR	floor mounted sensor	0	6
	E-SENS-GLAS	glass/foil mounted sensor	0	6
	E-SENS-PANL	sensor control unit	0	6
	E-SENS-WALL	wall mounted sensor	0	6
	E-CCTV-CLNG	ceiling mounted CCTV	0	6
	E-CCTV-WALL	wall mounted CCTV	0	6
	E-LITE-CLNG	ceiling mtd security lighting	0	7
	E-LITE-POLE	pole mtd security lighting	0	7
	E-LITE-WALL	wall mtd security lighting	0	7
	E-LOCK-ELEC	electric device	0	6
	E-LOCK-MANL	manual device	0	6
	E-DOOR-IDEN	door number and symbol,hardware	0	2
	E-POWR-JBOX	junction boxes	0	6
	E-POWR-RCPT	power receptables, etc	0	7
	E-POWR-CTXW	exposed wiring and conduit	0	7
	E-POWR-CTCW	concealed wiring and conduit	2	7
	E-POWR-CTID	wire/conduit size,tags,crcut id	0	4
	E-SITE-POLE	pole and pole mounted equipment	0	4
IM&T				
	E-COMM-EQID	identifiers and leader lines	0	4
	E-COMM-EQPM	physical outline of elec. Equip	0	7

Level Type	Level Name	Level Description	Line Style	Color
	E-COMM-JBOX	junction boxes	0	6
	E-COMM-NCID	identifier tags, symbol modifier	0	6
	E-COMM-NURS	nurse call system symbols	0	5
	E-COMM-SOUN	sound system symbols	0	6
	E-COMM-SSID	identifier tags, symbol modifier	0	6
	E-COMM-PHID	identifier tags, symbol modifier	0	6
	E-COMM-PHON	telephone system symbols	0	6
	E-COMM-TELV	television system symbols	0	6
	E-COMM-TVID	identifier tags, symbol modifier	0	5
	E-COMM-DAID	identifier tags, symbol modifier	0	5
	E-COMM-DATA	data/LAN system symbols	0	6
	E-COMM-INPA	intercom/PA system symbols	0	5
	E-COMM-PAID	identifier tags, symbol modifier	0	6
	E-COMM-FAID	identifier tags, symbol modifier	0	6
	E-COMM-FIRE	fire alarm and detect system sym	0	6
	E-COMM-EMCS	energy monitoring control system	0	7
	E-COMM-EMID	identifier tags, symbol modifier	0	6
	E-COMM-SEID	identifier tags, symbol modifier	0	6
	E-COMM-SERT	security system symbols	0	7
	E-COMM-COAX	coax cable	0	7
	E-COMM-FIBR	fiber optics cable	0	7
	E-COMM-IDEN	identifiers	0	6
	E-COMM-MULT	multi-conductor cable	0	7
	E-COMM-TRAY	cable tray and wire way symbols	0	6
	E-COMM-FPPL	information and symbols	0	6
	E-COMM-INFO	clearances and working space	0	4
	E-COMM-REFL	refl clg. information and symbols	0	6
	E-RISR-0003	light riser line work	0	3
	E-RISR-0010	medium riser line work	0	6
	E-RISR-0007	heavy riser line work	0	7

Level Type	Level Name	Level Description	Line Style	Color
Mechanical - HVAC (H)				
Ductwork				
	H-DUCT-EQPM	Air system equipment	0	4
	H-DUCT-EXHT	Exhaust ductwork	0	5
	H-DUCT-OTHR	Other ductwork	0	5
	H-DUCT-RETN	Return ductwork	0	5
	H-DUCT-SUPP	Supply ductwork	0	4
	H-DUCT-OUTA	Outside air transfer	0	5
Ductwork- Tenant Fit-Out				
	H-DUCT-EQPM-TNNT	Air system equipment tenant fit out	0	4
	H-DUCT-EXHT-TNNT	Exhaust ductwork tenant fit out	0	5
	H-DUCT-OTHR-TNNT	Other ductwork tenant fit out	0	5
	H-DUCT-RETN-TNNT	Return ductwork tenant fit out	0	5
	H-DUCT-SUPP-TNNT	Supply ductwork tenant fit out	0	4
	H-DUCT-OUTA-TNNT	Outside air transfer tenant fit out	0	5
Industrial Ventilation				
	H-VENT-DUCT	Ductwork	0	5
	H-VENT-EQPM	Equipment	0	4
Industrial Ventalation- Tenant Fit-Out				
	H-VENT-DUCT-TNNT	Ventilation ductwork tenant fit out	0	5
	H-VENT-EQPM-TNNT	Ventilation equipment tenant fit out	0	4
Controls				
	H-CONT-INST	Controls, instrumentation, diagrams, schematics and equipment	0	4
	H-CONT-WIRE	Control wiring and tubing (including pneumatic)	0	3
Controls- Tenant Fit-Out				
	H-CONT-INST-TNNT	Controls, instrumentation, diagrams, schematics and equipment tenant fit out	0	4

Level Type	Level Name	Level Description	Line Style	Color
	H-CONT-WIRE-TNNT	Control wiring and tubing (including pneumatic) tenant fit out	0	3
Energy Management				
	H-MNGT-EQPM	Equipment	0	4
	H-MNGT -PIPE	Piping	0	4
Energy Management- Tenant Fit-Out				
	H-MNGT-EQPM-TNNT	Equipment	0	4
	H-MNGT-PIPE-TNNT	Piping	0	4
Energy Recovery System				
	H-RCOV-EQPM-TNNT	Equipment tenant fit out	0	4
	H-RCOV-PIPE-TNNT	Piping tenant fit out	0	4
Construction Lines				
	H-CONS-CNTR	Center lines	7	1
	H-CONS-HDDN	Hidden lines	2	3
	H-CONS-PHAN	Phantom lines	4	9
	H-CONS-ALIGN	3D duct alignment lines	0	4
Construction Lines- Tenant Fit-Out				
	H-CONS-CNTR-TNNT	Center lines tenant fit out	7	1
	H-CONS-HDDN-TNNT	Hidden lines tenant fit out	2	3
	H-CONS-PHAN-TNNT	Phantom lines tenant fit out	4	9
	H-CONS-ALIGN-TNNT	3D duct alignment lines tenant fit out	0	4
Diffusers				
	H-DIFF-EXHT	Ceiling exhaust inlets	0	5
	H-DIFF-OTHR	Other inlets and outlets	0	5
	H-DIFF-RETN	Ceiling return inlets	0	5
	H-DIFF-SUPP	Ceiling supply outlets	0	4
Diffusers- Tenant Fit-Out				
	H-DIFF-EXHT-TNNT	Ceiling exhaust inlets tenant fit out	0	5
	H-DIFF-OTHR-TNNT	Other inlets and outlets tenant fit out	0	5
	H-DIFF-RETN-TNNT	Ceiling return inlets tenant fit out	0	5
	H-DIFF-SUPP-TNNT	Ceiling supply outlets tenant fit out	0	4
Mechanical - Piping (k)				
Chilled Water System				

Level Type	Level Name	Level Description	Line Style	Color
	K-CWTR-EQPM	Equipment	0	5
	K-CWTR-PIPE	Piping	0	5
Chilled Water System- Tenant Fit-Out				
	K-CWTR-EQPM-TNNT	Equipment tenant fit out	0	5
	K-CWTR-PIPE-TNNT	Piping tenant fit out	0	5
Hot Water Heating System				
	K-HWTR-EQPM	Equipment	0	4
	K-HWTR-PIPE	Piping	0	4
Hot Water Heating System- Tenant Fit-Out				
	K-HWTR-EQPM-TNNT	Equipment tenant fit out	0	4
	K-HWTR-PIPE-TNNT	Piping tenant fit out	0	4
Dual Temperature System				
	K-DUAL-EQPM	Equipment	0	4
	K-DUAL-PIPE	Piping	0	4
Dual Temperature System- Tenant Fit-Out				
	K-DUAL-EQPM-TNNT	Equipment tenant fit out	0	4
	K-DUAL-PIPE-TNNT	Piping tenant fit out	0	4
Steam System				
	K-STEH-COND	Condensate piping	0	4
	K-STEH-EQPM	Equipment	0	4
	K-STEH-HPIP	High pressure piping	0	4
	K-STEH-LPIP	Low pressure piping	0	4
	K-STEH-MPIP	Medium pressure piping	0	4
	K-CDRN-DRAN	Condensate drain	0	4
Steam System- Tenant Fit-Out				
	K-STEH-COND-TNNT	Condensate piping tenant fit out	0	4
	K-STEH-EQPM-TNNT	Equipment tenant fit out	0	4
	K-STEH-HPIP-TNNT	High pressure piping tenant fit out	0	4
	K-STEH-LPIP-TNNT	Low pressure piping tenant fit out	0	4
	K-STEH-MPIP-TNNT	Medium pressure piping tenant fit out	0	4
	K-CDRN-DRAN-TNNT	Condensate Drain tenant fit out	0	4
Refrigeration System				
	K-REFG-EQPM	Equipment	0	5
	K-REFG-PIPE	Piping	0	5
Refrigeration System- Tenant Fit-Out				
	K-REFG-EQPM-TNNT	Equipment tenant fit out	0	5
	K-REFG-PIPE-TNNT	Piping tenant fit out	0	5

Level Type	Level Name	Level Description	Line Style	Color
Fuel System				
	K-FUEL-EQPM	Equipment	0	5
	K-FUEL-GASP	Fuel gas piping	0	5
	K-FUEL-OILP	Fuel oil piping	0	5
Fuel System- Tenant Fit-Out				
	K-FUEL-EQPM-TNNT	Equipment tenant fit out	0	5
	K-FUEL-GASP-TNNT	Fuel gas piping tenant fit out	0	5
	K-FUEL-OILP-TNNT	Fuel oil piping tenant fit out	0	5
Energy Management				
	K-ENER-SYST	Energy management system	0	5
Energy Management- Tenant Fit-Out				
	K-ENER-SYST-TNNT	Energy management system tenant fit out	0	5
Wiskers				
	K-CONS-WHIS	Gasket whiskers/helper line	0	4
Wiskers- TEnant Fit-Out				
	K-CONS-TWHIS	Gasket whiskers/helper line	0	4
Intelligent Line Strings				
	K-CONS-IL	Intelligent Line String	0	4
Intelligent Line Strings- Tenant Fit-Out				
	K-CONS-TIL	Intelligent Line String	0	4
Mechanical - Plumbing (P)				
Construction Lines				
	P-CONS-CNTR	Center lines	0	4
	P-CONS-HDDN	Hidden lines	0	4
	P-CONS-PHAN	Phantom lines	0	4
Construction Lines- Tenant Fit-Out				
	P-CONS-CNTR-TNNT	Center lines tenant fit out	0	4
	P-CONS-HDDN-TNNT	Hidden lines tenant fit out	0	4
	P-CONS-PHAN-TNNT	Phantom lines tenant fit out	0	4
Demolition				
	P-DEMO-HAZW	Hazardous waste	0	5
	P-DEMO-REMV	Existing to be removed	2	3
	P-DEMO-STAY	Existing to remain	0	5
Demolition- Tenant Fit-Out				
	P-DEMO-HAZW-TNNT	Hazardous waste tenant fit out	0	5
	P-DEMO-REMV-TNNT	Existing to be removed tenant fit out	2	3
	P-DEMO-STAY-TNNT	Existing to remain tenant fit out	0	5

Level Type	Level Name	Level Description	Line Style	Color
Sanitary Drainage Piping				
	P-SANR-EQPM	Equipment (sand/oil/water separators)	0	5
	P-SANR-FLDR	Floor drains and clean outs	0	5
	P-SANR-PIPE	Piping	0	5
	P-SANR-VENT	Vent piping	0	5
Sanitary Drainage Piping- Tenant Fit-Out				
	P-SANR-EQPM-TNNT	Equipment (sand/oil/water separators) tenant fit out	0	5
	P-SANR-FLDR-TNNT	Floor drains and clean outs tenant fit out	0	5
	P-SANR-PIPE-TNNT	Piping tenant fit out	0	5
	P-SANR-VENT-TNNT	Vent piping tenant fit out	0	5
Storm Drainage Piping				
	P-STRM-PIPE	Storm drain piping	0	4
	P-STRM-RFDR	Roof drains	0	4
	P-STRM-RPIP	Roof drain piping	0	4
Storm Drainage Piping- Tenant Fit-Out				
	P-STRM-PIPE-TNNT	Storm drain piping tenant fit out	0	4
	P-STRM-RFDR-TNNT	Roof drains tenant fit out	0	4
	P-STRM-RPIP-TNNT	Roof drain piping tenant fit out	0	4
Medical Gas Piping				
	P-MDGS-EQPM	Equipment	0	5
	P-MDGS-PIPE	Piping	0	5
Medical Gas Piping- Tenant Fit-Out				
	P-MDGS-EQPM-TNNT	Equipment tenant fit out	0	5
	P-MDGS-PIPE-TNNT	Piping tenant fit out	0	5
Laboratory Piping				
	P-LABS-EQPM	Equipment	0	4
	P-LABS-PIPE	Piping	0	4
Laboratory Piping- Tenant Fit-Out				
	P-LABS-EQPM-TNNT	Equipment tenant fit out	0	4
	P-LABS-PIPE-TNNT	Piping tenant fit out	0	4
Dental Piping				
	P-DENT-EQPM	Equipment	0	5
	P-DENT-PIPE	Piping	0	5
Dental Piping- Tenant Fit-Out				
	P-DENT-EQPM-TNNT	Equipment tenant fit out	0	5
	P-DENT-PIPE-TNNT	Piping tenant fit out	0	5
Natural Gas (or Liquid Petroleum) Piping				
	P-NTGS-EQPM	Equipment	0	4

Level Type	Level Name	Level Description	Line Style	Color
	P-NTGS-PIPE	Piping	0	4
Natural Gas (or Liquid Petroleum) Piping- Tenant Fit-Out				
	P-NTGS-EQPM-TNNT	Equipment tenant fit out	0	4
	P-NTGS-PIPE-TNNT	Piping tenant fit out	0	4
Compressed Air Piping				
	P-CMPA-EQPM	Equipment	0	5
	P-CMPA-PIPE	Piping	0	5
Compressed Air Piping- Tenant Fit-Out				
	P-CMPA-EQPM-TNNT	Equipment tenant fit out	0	5
	P-CMPA-PIPE-TNNT	Piping tenant fit out	0	5
Process Piping				
	P-PROC-EQPM	Equipment	0	4
	P-PROC-RPIP	Return piping	0	4
	P-PROC-SPIP	Supply piping	0	5
Process Piping- Tenant Fit-Out				
	P-PROC-EQPM-TNNT	Equipment tenant fit out	0	4
	P-PROC-RPIP-TNNT	Return piping tenant fit out	0	4
	P-PROC-SPIP-TNNT	Supply piping tenant fit out	0	5
Miscellaneous Plumbing				
	P-MISC-EQPM	Equipment	0	5
	P-MISC-PIPE	Piping	0	5
Miscellaneous Plumbing- Tenant Fit-Out				
	P-MISC-EQPM-TNNT	Equipment tenant fit out	0	5
	P-MISC-PIPE-TNNT	Piping tenant fit out	0	5
Industrial Waste Piping				
	P-INDW-EQPM	Acid, alkaline, and oil waste equipment	0	5
	P-INDW-PIPE	Acid, alkaline, and oil waste piping	0	5
	P-INDW-VENT	Acid, alkaline, and oil waste vent piping	0	5
Industrial Waste Piping- Tenant Fit-Out				
	P-INDW-EQPM-TNNT	Acid, alkaline, and oil waste equipment tenant fit out	0	5
	P-INDW-PIPE-TNNT	Acid, alkaline, and oil waste piping tenant fit out	0	5
	P-INDW-VENT-TNNT	Acid, alkaline, and oil waste vent piping tenant fit out	0	5
Domestic Water Piping System				
	P-DOMW-CPIP	Domestic cold water piping	0	5
	P-DOMW-EQPM	Hot and cold water equipment	0	5
	P-DOMW-HPIP	Domestic hot water piping	0	4

Level Type	Level Name	Level Description	Line Style	Color
	P-DOMW-RPIP	Domestic hot water re-circulation piping	0	4
Domestic Water Piping System- Tenant Fit Out				
	P-DOMW-CPIP-TNNT	Domestic cold water piping tenant fit out	0	5
	P-DOMW-EQPM-TNNT	Hot and cold water equipment tenant fit out	0	5
	P-DOMW-HPIP-TNNT	Domestic hot water piping tenant fit out	0	4
	P-DOMW-RPIP-TNNT	Domestic hot water re-circulation piping tenant fit out	0	4
Wiskers				
	P-CONS-WHIS	Gasket whiskers/helper line	0	4
Wiskers- Tenant Fit-Out				
	P-CONS-WHIS-TNNT	Gasket whiskers/helper line tenant fit out	0	4
Intelligent Line Strings				
	P-CONS-IL	Intelligent Line String	0	4
Intelligent Line Strings- Tenant Fit-Out				
	P-CONS-IL-TNNT	Intelligent Line String tenant fit out	0	4
B.2.5 Structural (S)				
Foundation				
	S-FNDN-FTNG	Footings	2	4
	S-FNDN-GRBM	Grade Beams	2	4
	S-FNDN-PIER	Piers	2	4
	S-FNDN-PATT	Foundation patterning	0	9
	S-FNDN-PILES	Foundation Piles	3	7
Grid Lines				
	S-GRID	Structural Grid Lines	7	9
Curbs				
	S-CURB-CONC	Concrete Curb	0	4
Joints				
	S-JNTS-CNTJ	Construction joints	2	2
	S-JNTS-CTLJ	Control Joints	5	2
	S-JNTS-EXPJ	Expansion joints	5	2

Level Type	Level Name	Level Description	Line Style	Color
Slabs				
	S-SLAB-OPNG	Slab Opening	0	6
	S-SLAB-OTLN	Slab outline	0	6
	S-SLAB-PATT	Slab outline pattering	0	9
	S-SLAB-BOLT	Anchor bolts for equipment on slabs	0	11
	S-SLAB-SLOP	Slab Contour – Slope Line	0	0
	S-SLAB-DROP	Slab Underside Drop Projection	2	12
	S-SLAB-EXST	Existing Concrete Slab	0	9
Walls				
	S-WALL-CMUW	CMU walls	0/2	4
	S-WALL-CONC	Concrete walls	0/2	4
	S-WALL-STEL	Steel Stud Walls	0	4
	S-WALL-PATT	Wall pattering	0	4
Concrete Beams				
	S-BEAM-CONC	Concrete Beams	0	5
Steel Beams				
	S-BEAM-STEL	Steel Beams	0	5
Columns				
	S-COLS-CONC	Concrete Columns	0	5/11
	S-COLS-STEL	Steel Columns	0	5/11
	S-COLS-PATT	Structural Column Patterning	0	9
	S-COLS-EXST	Existing Columns	6	9
Deck				
	S-DECK-FLOR-CONC	Concrete Floor Deck	0	2
	S-DECK-ROOF-CONC	Concrete Roof Deck	0	2
	S-DECK-FLOR-STEL	Steel Floor Deck	0	2
	S-DECK-ROOF-STEL	Steel Roof Deck	0	2
Open Web Joists				
	S-JOIS	Joists - Plan & Sections	6	5
	S-JOIS-BRGX	Cross Bridging (X)	0	4
	S-JOIS-BRGL	Horiz. Line Bridging (---------)	2	4
Pipes				
	S-PIPE	Structural Pipes	0	11
	S-PIPE-PATT	Structural Pipes Patterning	0	9
Trusses				

Level Type	Level Name	Level Description	Line Style	Color
	S-TRUS-STEL	Steel Truss	0	5
Reinforcement				
	S-RBAR-TOP1	Reinforcement Bar – Top	0	10
	S-RBAR-BOT1	Reinforcement Bar – Bottom	5	5
	S-PLAT-STEL	Structural Plates	0	11
	S-CHAN-STEL	Structural Channels	0	11
	S-TUBE-STEL	Structural Tubes	0	11
	S-TEES-STEL	Structural Tees	0	11
	S-WWF1-STEL	Structural Welded Wire Fabric	0	23
Finish				
	S-FNSH	Architectural Finish & Misc.	6	0
B.2.6 Fire Protection (Y)				
Sprinkler System				
	Y-SPRN-BULK	Sprinkler system: bulk main	0	5
	Y-SPRN-CLHD	Sprinkler system: ceiling heads	0	5
	Y-SPRN-DETL	Sprinkler system: details	0	5
	Y-SPRN-PIPE	Sprinkler system: piping	0	5
	Y-SPRN-STAN	Sprinkler system: standpipe	0	5
	Y-SPRN-ZONE	Sprinkler system: zones	0	5
B.2.7 Fire Alarm (Z)				
Fire Alarm				
	Z-FIRE-UNDR	dedicated fire protection-underground	0	5
	Z-SUPP-ALRM	fire alarms	0	6
	Z-SUPP-EQPM	equipment	0	6
	Z-SUPP-SMOK	smoke detectors or heat sensors	0	6
	Z-POWR-CTXW	exposed wiring and conduit	0	7
	Z-POWR-CTCW	concealed wiring and conduit	2	7
	Z-COMM-FIRE	fire alarm/detection system symbols	0	6
	Z-POWR-JBOX	junction boxes	0	6
	Z-PATT		0	4

7 Exhibits

Exhibit A.1 - Directory Structure

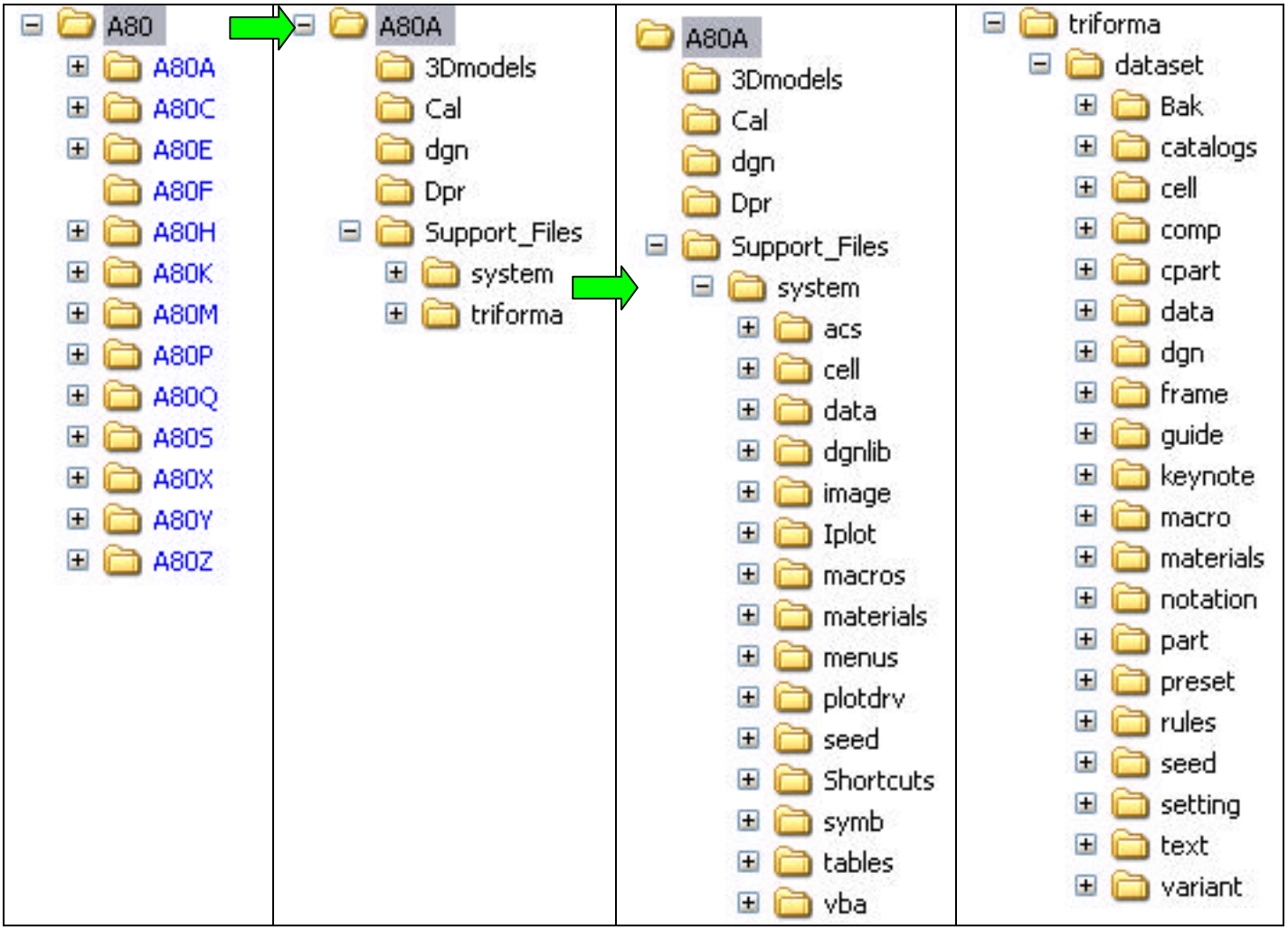


Exhibit A.3 - Title Block

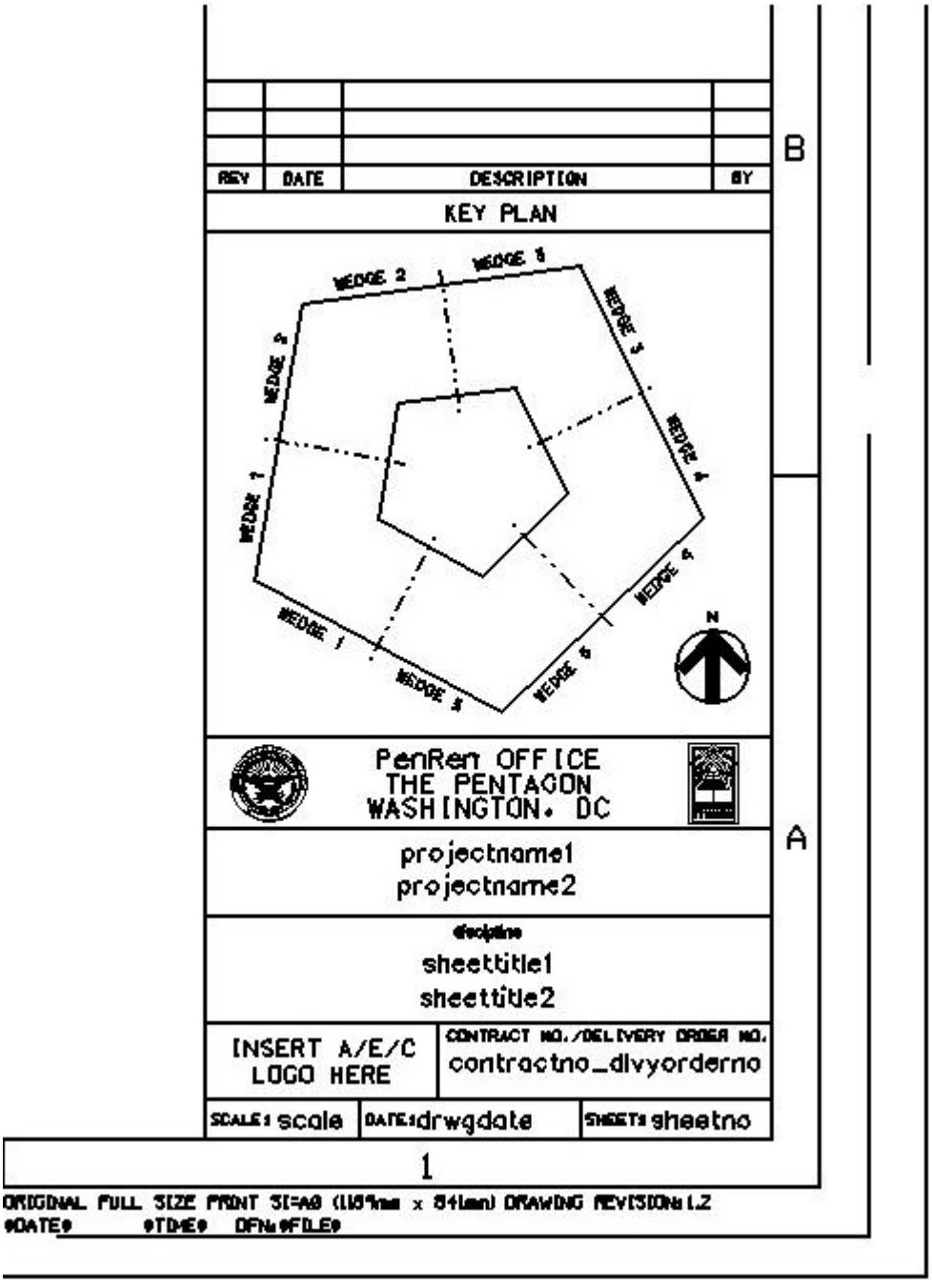


Exhibit A.4 - Standard Imperial Sheet Sizes

Designation	Width	Length
Arch E Full size sheets	36”	48”
Arch C Half size sheets	18”	24”
11x17	11”	17”
Letter	8-1/2”	11”

Exhibit A.5 - Typical Imperial Drawing Scales

Drawing Type	Scale
Site Plan	1” = 100’-0” 1” = 200’-0”
Overall Plans	1” = 64’-0”
Floor Plans	1/32” = 1’-0” 1/16” = 1’-0” 1/8” = 1’-0”
Roof plan (no smaller than)	1/16” = 1’-0”
Exterior elevations	1/8” = 1’-0”
Interior Elevations	1/8” = 1’-0”
Cross sections	1/8” = 1’-0”
Wall sections	3/4” = 1’-0”
Enlarged Plan Details	1/4” = 1’-0”

Details	3/4” = 1’-0” 1-1/2” = 1’-0”

Exhibit A.6 – Penren Colors and associated Pen Widths

Monochrome Color to Pen weight Table

Color # 1	pen weight	0.003 inches =	0.10 mm	Black
Color # 2	pen weight	0.007 inches =	0.20 mm	Black
Color # 3	pen weight	0.010 inches =	0.25 mm	Black
Color # 4	pen weight	0.013 inches =	0.35 mm	Black
Color # 5	pen weight	0.020 inches =	0.50 mm	Black
Color # 6	pen weight	0.020 inches =	0.50 mm	Black
Color # 7	pen weight	0.023 inches =	0.60 mm	Black
Color # 8	pen weight	0.003 inches =	0.10 mm	Black
Color # 9	pen weight	0.003 inches =	0.10 mm	Black
Color # 10	pen weight	0.017 inches =	0.40 mm	Black
Color # 11	pen weight	0.010 inches =	0.25 mm	Black
Color # 12	pen weight	0.010 inches =	0.25 mm	Black
Color # 13	pen weight	0.007 inches =	0.20 mm	RGB 166,166,166
Color # 14	pen weight	0.007 inches =	0.20 mm	RGB 127,127,127
Color # 15	pen weight	0.007 inches =	0.20 mm	RGB 90,90,90
Color # 16	pen weight	0.030 inches =	0.75 mm	Black
Color # 17	pen weight	0.040 inches =	1.00 mm	Black
Color # 18	pen weight	0.050 inches =	1.25 mm	Black
Color # 19	pen weight	0.075 inches =	1.90 mm	Black
Color # 20	pen weight	0.100 inches =	2.50 mm	Black
Color # 21	pen weight	0.030 inches =	0.75 mm	RGB 90,90,90
Color # 22	pen weight	0.040 inches =	1.00 mm	RGB 90,90,90
Color # 23	pen weight	0.050 inches =	1.25 mm	RGB 90,90,90
Color # 24	pen weight	0.075 inches =	1.90 mm	RGB 90,90,90
Color # 25	pen weight	0.100 inches =	2.50 mm	RGB 90,90,90

Exhibit A.7 - CADD File Catalog

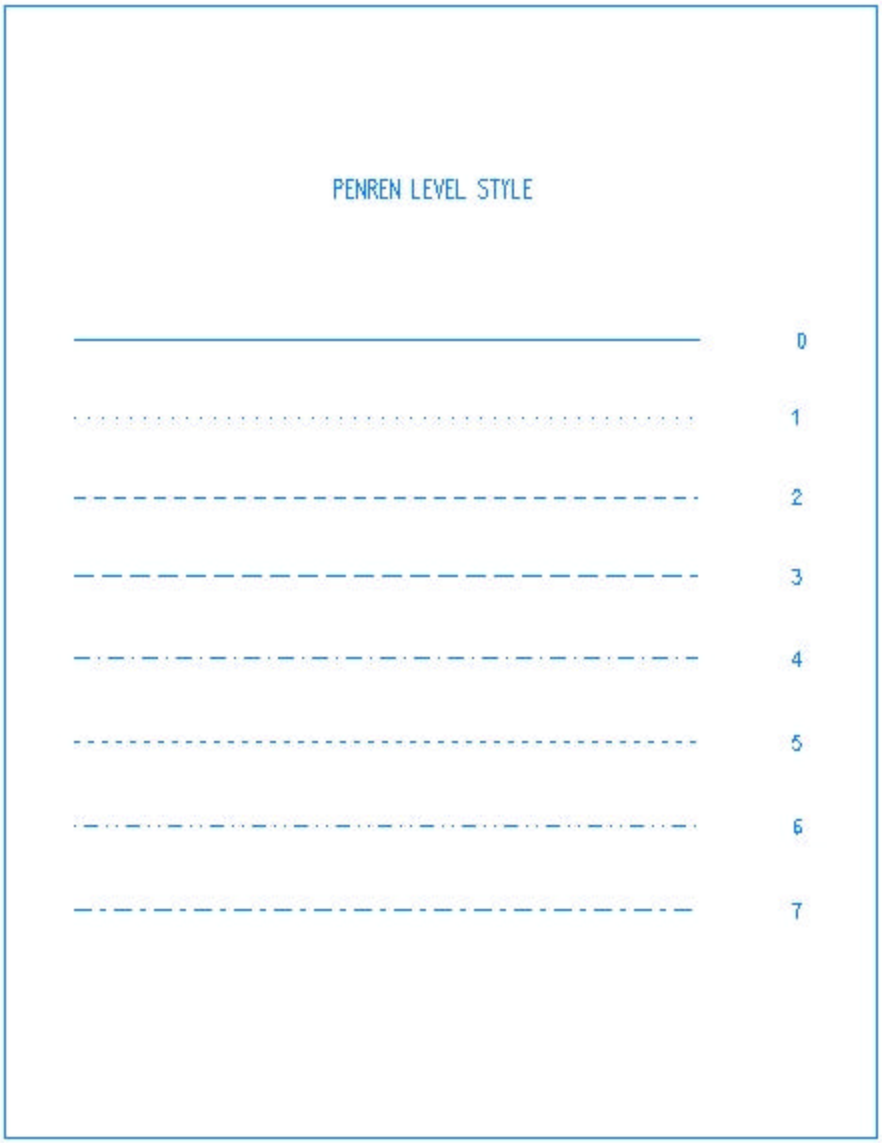
Active File Data Catalog

Project Name	Pentagon Renovation Wedges 2-5
Project ID.	A80 – Core & Shell *
Contract No.	MDA947-01-C-2001
Discipline Designator	A – Architectural Prime
Plate No.	001
Sheet No.	AF-01
Sheet Title	First Floor Plan – Wedge 2
Electronic File Name	a80af01_.dgn
Model File Name	a80af01m.dgn
Scale	1/8” = 1’-0”
Reference File(s) attached at scale 1:1 with insertion point origin 0,0,0	xa80gb00_.dgn, xa80ap01_.dgn, xa80at01_.dgn, xa80al01_.dgn

*** For ‘Project ID : A79-Master Plan’, All file names shall be modified from A80 to A79, Xa80 to Xa79, Ea80 to Ea79 and Ma80 to Ma79 accordingly.**

Exhibit A.8 – Penren Level Style

Level Style numbers and appearance



8 Appendix D – PRPEDS Revision Details

PRPEDS Revisions Table

Revision Number	Sections/Page(s) Affected	Revision Date	Nature of Revisions
1	All	05/03/02	General revision
2	All	10/14/02	General revision
3	All	12/20/02	General revision
4	All	03/17/03	General revision